Improving compliance and on-task behaviour with a self-management intervention within a mainstream school.

A thesis

submitted in partial fulfilment

of the requirements for the degree

of

Master of Applied Psychology
(Behaviour Analysis)

at

The University of Waikato

by

Alice Higgs

THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

2019

Abstract

Compliant behaviour is a key skill related to the social and academic success of children. Extending the research conducted by Lee (2016), the goal of this study was to evaluate the effectiveness of a technology-based self-management intervention on the compliant behaviour of two typically developing 10-year-old boys. Students each used an iPod Touch (6th generation) with iOS 12.2 and an inbuilt message notification system to receive visual prompts from the researcher, prompting them to record their behaviour on an application. The application 'StickerPop! Sticker Charts' was used by each of the participants to self-record their compliant behaviour. The effect of the intervention was assessed within a multiple baseline across participants design, incorporating a reversal design. Results indicate that the intervention was highly effective in increasing compliant behaviour for both participants. Concomitant improvements in on-task behaviour were also observed for one participant. These results were maintained during a two-week follow-up. The intervention was judged highly acceptable by the participants and their teacher. Overall, the intervention was effective within a classroom environment over a relatively short amount of time, benefiting the teacher and students. Strengths, limitations, and the theoretical implication of this study are discussed. Future research is suggested.

Acknowledgements

Firstly, I would like to thank my supervisor, Associate Professor Angelika Anderson, for the constant support and encouragement that I received throughout this project. I have learnt a lot from the guidance and feedback that you provided, and so I want to thank you for the valuable experience that this has been.

I would also like to offer my special thanks to the participants who took part in this study, as well as their families, teachers, and school, who offered their time for this research and supported me throughout the study. Without them, this thesis would not have been possible.

I would like to express my appreciation to my family, especially to my parents, Mike and Julie. Thank you for the constant love, support, and patience that you have given me throughout this whole process. I would not have been able to finish this without your encouragement and motivation.

Finally, I would like to give a special thanks to my friends as well as Annette and the team at Spotlight. Thank you for the constant motivation, words of support, and reassurance that you gave me over the last year. You are all greatly appreciated.

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Introduction

Compliance is an essential skill for children to have in general education settings. Following the instructions delivered by teachers, also known as compliant behaviour, has numerous benefits for children as well as the people around them. Not only is compliant behaviour associated with academic success when the behaviour occurs at school, but compliance is also a key part of socialisation (Atwater & Morris, 1988; Cooper, Heron, & Heward, 2014). As children get older, they learn how they should behave in different situations, and as social beings, a certain level of compliance is required to be able to live alongside each other. However, not all children fully develop the skill of following common instructions, indicating that additional support for the skill deficit is necessary.

While the majority of students will progress through school without the need for additional academic, social, or behavioural assistance, according to Lower et al. (2016), up to 15% of students require extra support to succeed during school. However, the behaviour of typically developing children is often overlooked within schools, with most of the support for school-aged children aimed towards individuals with disabilities, behavioural disorders, and learning disorders. The minimal support for typically developing children is partly due to a high student to teacher ratio, as many teachers do not have the time to individually help children with their specific needs (Reinecke, Krokowski, & Newman, 2016). The time it takes to attend to classroom behaviour, including low rates of compliance and on-task behaviour, often results in less time for normal teaching activities (Aloe, Shisler, Norris, Nickerson, & Rinker, 2014).

Limited support for teachers and students is currently a prominent issue within New Zealand, with a large number of teachers striking and protesting for better work

conditions. According to Powell (2019, May 15), primary and secondary school teachers have recently protested issues including “class sizes, under-resourced staff and a lack of support for students with special needs and learning difficulties” (para. 2). There is a shortage of teachers within New Zealand, and the current working conditions lead to overworked teachers, and result in a high rate of teacher burnout, with many teachers considering leaving the profession (Aloe et al., 2014; Powell, 2019, May 15).

Therefore, there is a need for a behavioural intervention in classrooms that is easy to implement and not time-consuming to administer. One possible way to help with low rates of compliance could be to introduce self-management programmes into mainstream classrooms. Self-management is an evidence-based behavioural intervention which puts individuals in charge of modifying their behaviour with the use of goal setting, self-monitoring, and reinforcement (Cooper et al., 2014). Benefiting both teachers and students, not only could the intervention result in a reduction of time teachers spend attending individual students’ behaviour, but students could increase independence and develop the skill of following instructions (Reinecke et al., 2016).

While there are several established interventions currently used to improve the skill of compliant behaviour, many of these interventions are often demanding and not feasible for teachers within mainstream classrooms (Mace, 1996; Rames‐Lapointe, Hixson, Niec, & Rhymer, 2014). Therefore, in this study, I aim to evaluate the use of a technology-based self-management intervention to increase compliance and on-task behaviour for typically developing children within a mainstream primary school.

Literature Review

Compliance and Non-compliance

Compliance is a skill which is developed throughout childhood and refers to "acting in accordance with a directive to engage in or to stop engaging in a behaviour" (Owen, Slep, & Heyman, 2012, p. 364). A directive, or instruction, is delivered with the expectation that the behaviour of an individual, or a group of individuals, will change to follow the instruction within a reasonable amount of time (Atwater & Morris, 1988; Schoen, 1983). If the behaviour does not change according to the instruction, then this is considered to be non-compliance. *Non-compliance* refers to "failing to follow or doing the opposite of an instruction, directive, or request", and includes the presence of undesirable responses, or the absence of a response within a reasonable amount of time (Owen et al., 2012, p. 364). A reasonable amount of time between an instruction and the target behaviour depends on the type of instruction given, but several studies have indicated that the change of behaviour will ideally occur within 10-seconds of the delivered instruction (Beaulieu, Hanley, & Roberson, 2013; Musser, Bray, Kehle, & Jenson, 2001; Russo, Cataldo, & Cushing, 1981).

Although compliance is generally viewed as a dichotomous behaviour, Kochanska and Aksan (1995) stated that compliance is a complex concept which includes five types of behaviour. Committed compliance and situational compliance are two types of compliant behaviour, while passive non-compliance, negotiation or refusal, and defiance are three types of non-compliance. *Committed compliance* indicates that compliant behaviour is fully embraced and occurs without other people present, whereas *situational compliance* refers to a lack of complete compliance and only occurs when there are others present (Gralinski & Kopp, 1993; Kochanska & Aksan, 1995). In contrast, while *passive non-compliance* refers to an absence of responses such as when

instructions are ignored, *negotiation or refusal* and *defiance* refer to the presence of responses such as an objection to instructions, and the complete rejection of instructions (Kochanska & Aksan, 1995). The behaviour of an individual can be situated at any point on this scale when an instruction is delivered, which could depend on the individual themselves as well as environmental influences.

Non-compliance.

Non-compliance is not desirable within a school setting. A low rate of compliance and the presence of other responses can have negative effects on individuals as well as for the people around them. Not following classroom instructions has been found to have a negative impact on a child's prosocial skills, on-task behaviour, and academic performance, as well as a wider effect on their peers, teachers, and parents (Owen et al., 2012). This wider impact includes causing a distraction to peers, taking the teacher's attention away from other children, and causing stress for teachers as well as parents (Cipani, 1998; Fox, Vaughn, Wyatte, & Dunlap, 2002). In addition, according to a number of studies, repeated non-compliance can be associated with more serious behavioural issues, including verbal or physical aggression, antisocial behaviour, and property destruction (Cipani, 1998; Marchant, Young, & West, 2004; Owen et al., 2012; Walker, Colvin, & Ramsey, 1996).

Factors influencing non-compliance. There are various factors which contribute to the presence of non-compliance within the classroom. Marchant et al. (2004) suggested that non-compliance can occur due to environmental influences such as a change in teacher or lesson plan, as well as from peer or sibling behaviour. Some children are influenced by, and often model the behaviour of their peers, resulting in non-compliance in the classroom. In contrast, non-compliance can also occur due to factors relating to the individual, with Ylvisaker, Hibbard, and Feeney (2006)

suggesting that types of non-compliance can be placed into two categories; failure to comply and refusal to comply. From this perspective, a child could fail to comply due to not understanding an instruction, not hearing the instruction, not being capable of performing the required behaviour, or not having necessary skills, such as a deficit in listener behaviour (Ylvisaker et al., 2006). In comparison, when a child refuses to comply, it is assumed that they understand and are capable of following the instruction, but are choosing not to do so (Ylvisaker et al., 2006). It is important to determine whether a child has a deficit in the skills needed to follow an instruction or is intentionally choosing not to follow an instruction, to determine the function of behaviour as well as a suitable intervention to increase compliant behaviour.

The function and maintenance of non-compliance. Following on from the idea that some children have the ability to comply but choose not to follow instructions, it is important to gain an understanding of the function and maintenance of non-compliance to implement a suitable intervention. According to Cipani (1998), there are three possible functions of non-compliance, which include attention-seeking, mild escape or avoidance, as well as extreme aversion. Attention-seeking is maintained by positive reinforcement, while escape, avoidance, and extreme aversion are all maintained by negative reinforcement (Cipani, 1998; Cooper et al., 2014; Owen et al., 2012).

Attention-seeking generally arises when attention for non-compliance occurs at a higher rate than attention for compliant behaviour (Cipani, 1998). If students are not receiving attention when they are following instructions, some children may choose not to comply with an instruction to receive attention from their teachers or peers, regardless of whether they receive positive or negative attention for this behaviour. The attention given to children who are not following instructions is often in the form of

approval from other students such as laughter, or disapproval from teachers in the form of reminders or frowning (Cipani, 1998).

In contrast, escape and avoidance have also been found to be functions of non-compliance in the classroom. While a child will escape to get out of a task that they are already participating in, they may avoid a task by not coming in contact with the situation. In regards to non-compliance, escape and avoidance can both be in the form of ignoring the teacher's requests, completing another task, or verbally objecting to follow an instruction (Cipani, 1998). Both of these behaviours are likely to occur if a child is repeatedly successful at using these techniques to get out of something they have been asked to do, either entirely or for a delay (Cipani, 1998). In addition, Cipani (1998) noted that once non-compliance does not work to escape or avoid a task, extreme aversive behaviours could develop such as running away, or as intense expressions of aggressive behaviours such as hitting and kicking. These are more intense forms of non-compliance and these behaviours can influence the rate at which a teacher delivers instructions for children who demonstrate non-compliance to this level.

Depending on the function and maintenance of non-compliance, different methods of intervention can be used to increase compliant behaviour. While many studies focus on compliance as a target behaviour to increase and non-compliance as a target behaviour to decrease, I will focus this research on the idea that compliance is a target behaviour to be increased, and a skill which can be taught.

Compliant behaviour.

A number of researchers have highlighted the importance of viewing compliance as a behaviour that develops from an early age (Atwater & Morris, 1988; Kochanska & Aksan, 1995; Marchant et al., 2004; Reddy, Liebal, Hicks, Jonnalagadda, & Chintalapuri, 2013). In a study conducted by Reddy et al. (2013), it was found that

compliant responses can begin from 6.5-months-old and that the rate of compliant behaviour increases with age. Types of requests that infants typically comply with can include looking at a picture an adult is pointing at or pulling on the string of a toy after an adult has modelled the behaviour (Reddy et al., 2013). From a verbal behaviour perspective, the development of compliant behaviour is in line with the development of communication skills. As listener skills are taught and developed from infancy, children are learning to comply with different requests from those around them (Skinner, 1953), indicating that compliance is both a communication skill and a social skill.

Over time, a child's ability to comply with requests increases and there is a shift towards self-regulation, with parents becoming distant monitors (Kochanska & Aksan, 1995). According to a number of researchers (Atwater & Morris, 1988; Marchant et al., 2004; Reddy et al., 2013), compliance is an important behaviour for children to develop, as they are expected to follow their teacher's instructions and requests when attending school. According to McMahon and Forehand (2003), it is ideal for children to follow between 60% and 90% of instructions, with the thought that a compliance rate of 100% is not adaptive. In addition, according to Kochanska and Aksan (1995), as children get older, committed compliance tends to increase, while situational compliance tends to decrease because children who enter school are no longer being monitored by their parents. However, there are many children who fail to comply with common instructions and have their non-compliance maintained by environmental influences. As a result, these children may need to be taught and encouraged to follow instructions.

Compliance as a skill. When looking to improve compliant behaviour, a number of studies focus on non-compliance as a series of unwanted behaviours and explore methods to reduce these behaviours (Kochanska & Aksan, 1995). However, there has been an increase in research which positions compliance as a skill to be learned, with a

focus on how to improve this skill for children both at home as well as within the classroom (Atwater & Morris, 1988; Beaulieu et al., 2013; Bouxsein, Roane, & Harper, 2011; Lui, Moore, & Anderson, 2014; Marchant et al., 2004; Schoen, 1983).

According to Schoen (1983), compliance "is theoretically conceptualised as a skill that is developed along a learning gradient" (p. 483). From this perspective, it is thought that compliance is a skill because it is learned and developed in three phases; acquisition, fluency, and generalisation. The *acquisition* phase involves learning to respond to an instruction, the *fluency* phase involves increasing the rate of compliance for those who demonstrate passive non-compliance, and the *generalisation* phase involves demonstrating that the skill of compliance can be applied across different settings and over time (Schoen, 1983).

Teaching compliance as a skill. Viewing compliance as a skill indicates that compliance is a behaviour that children can be taught. Although the rate of compliance generally improves as children get older, children often do not exhibit equal levels of compliance in all settings and some children have a deficit in the skill. Therefore, many studies focus on the importance of the acquisition of compliant behaviour. In relation to Applied Behaviour Analysis (ABA), one of the main principles is to gain an understanding of the antecedents and consequences of behaviour and to intervene at one of these stages (Cooper et al., 2014). In terms of the acquisition of compliant behaviour, antecedent strategies are applied before the behaviour occurs, and consequent strategies are applied after a behaviour occurs.

According to Schoen (1983), there are many methods that can be used to teach children the skill of following instructions, with many including the use of reinforcement as a consequent-based technique. This includes the use of positive reinforcement or negative reinforcement after an instruction is given, or sometimes

guidance to decrease non-compliance. While positive reinforcement involves presenting a stimulus to increase the future probability of behaviour, negative reinforcement involves removing a stimulus to increase the future probability of behaviour (Cooper et al., 2014).

Bouxsein et al. (2011) conducted a study to evaluate the use of reinforcement to increase the compliant behaviour of a 14-year-old boy. In this study, it was found that a combination of positive and negative reinforcement was more effective than only using one type of reinforcement to increase the rate of compliance (Bouxsein et al., 2011). Wilder et al. (2012) took this concept a step further and compared the use of positive and negative reinforcement to antecedent-based interventions such as rationales and advanced notice. In this study, it was found that consequent-based techniques are more effective than antecedent-based techniques to reduce non-compliance and to improve compliant behaviour. After a high rate of compliance is reliably occurring, the use of reinforcement can be faded, and replaced by naturally occurring contingencies such as a parent or teacher saying “thank-you” for following an instruction. A high rate of compliance then continues to occur without direct intervention (Wilder et al., 2012). In contrast, conflicting results have found that antecedent-based techniques are also successful in improving compliant behaviour (Bross et al., 2018; Ducharme & DiAdamo, 2005; Dufrene et al., 2012; Everett et al., 2005).

Evidence-Based Interventions to Improve Compliance

There are a number of evidence-based approaches that have been developed to increase compliant behaviour, each of which has benefits as well as limitations. While consequent-based techniques such as reinforcement have been proven to be effective at increasing the rate of compliant behaviour, a number of approaches involve using antecedent-based techniques.

Effective Instruction Delivery.

Effective Instruction Delivery (EID) is an antecedent-based intervention which involves altering the way in which an instruction is delivered to increase the rate of compliance. EID generally involves establishing proximity and eye-contact, ensuring direct, clear instructions are delivered, waiting five seconds for a response, and then providing reinforcement for the correct response (Ford, Olmi, Edwards, & Tingstrom, 2001). It has been theorised that depending on the individual, the wording of an instruction as well as the presence of non-verbal cues have an impact on the behaviour that follows (Beaulieu et al., 2013; Mandal, Olmi, Edwards, Tingstrom, & Benoit, 2000; Schoen, 1983). Instructions can be delivered in the form of a directive, command, suggestion, or request, and non-verbal cues can include eye-contact as well as proximity (Atwater & Morris, 1988; Everett, Olmi, Edwards, & Tingstrom, 2005).

A number of studies have shown that this intervention has been successful in increasing the rate of compliance within clinical settings (Everett et al., 2005; Mandal et al., 2000), within schools (Dufrene et al., 2012; Ford et al., 2001) as well as within the home (Benoit, Edwards, Olmi, Wilczynski, & Mandal, 2001). When evaluating the aspects of EID separately, it has been shown that eye-contact is an important factor needed to improve compliance (Everett et al., 2005). It has also been indicated that the wording of instructions can have an impact on compliance, such as being worded as a suggestion rather than a demand or request (McLaughlin, 1983). However, conflicting results have indicated that the wording of an instruction is indifferent and does not have an impact on the rate of compliance (Atwater & Morris, 1988; Everett et al., 2005). Atwater and Morris (1988) found that rather than the delivery of the instruction, it is actually the context of the instruction that affects the behaviour of a child. In this study, it was found that there was a higher compliance rate for children who were already

taking part in an activity compared to children who were already off-task (Atwater & Morris, 1988).

While EID has been successful in many contexts, it has been found to have some problems within the classroom setting, such as using teacher's time to learn and implement the treatment, as well as consistency issues from the teacher due to the number of students they have to focus on within the class (Dufrene et al., 2012). In addition, Lui et al. (2014) implemented an EID intervention to increase the compliance rates of two children with Autism Spectrum Disorder (ASD). Although EID did improve compliance rates, a self-management intervention was added, as the size of the effect from EID alone was limited (Lui et al., 2014).

High-Probability Request Sequence.

High-Probability Request Sequence (HPRS) is an antecedent-based intervention which involves manipulating the order in which instructions are delivered to create behavioural momentum and to improve compliant behaviour. The term *behavioural momentum* refers to the "tendency for behaviour to persist following a change in environmental conditions" (Mace et al., 1988, p. 123). It is thought that the higher the rate of a reinforcement schedule, the more likely the behaviour will persist over time (Nevin, Mandell, & Atak, 1983). According to Cooper et al. (2014), this intervention involves presenting a series of requests which have a high probability of occurring, and once these requests have been followed, a low-probability request is immediately presented. While *high-probability requests* refer to highly preferred tasks that an individual will willingly complete, *low-probability requests* refer to less preferred tasks that an individual does not want to complete. When the HPRS intervention is applied, behavioural momentum is created and the child is more likely to comply with the less preferred task (Bross et al., 2018).

HPRS has been shown to be successful in producing a high rate of compliant behaviour with children in a number of settings including mainstream classrooms, and is frequently used with children from preschool up to adolescents as well as with individuals who have been diagnosed with ASD (Brosh, Fisher, Wood, & Test, 2018; Bross et al., 2018). It has been found that this intervention is effective with increasing the speed at which compliance occurs and it has been found to be an effective method to effortlessly get a whole class to move into a new activity (Bross et al., 2018; Mace et al., 1988). Although this has been proven to be an effective method to improve compliance, HPRS does have weaknesses. The effectiveness of this method increases as the number of high-probability requests increase, but this is not always feasible in the general education setting (Mace, 1996). Shorter sequences increase efficiency, and teachers generally do not have time to deliver three to five high-probability requests every time they want to deliver a low-probability request (Mace, 1996). Also, if more than one student is showing non-compliance, teachers will not have time to deliver this intervention with these students when they are trying to focus on and teach an entire class of 20-30 students.

Errorless Compliance Training.

Errorless Compliance Training (ECT) is another antecedent-based intervention which is successful with increasing the rate of compliant behaviour and similar to HPRS, applies the concept of behavioural momentum. This approach uses the techniques of EID, reinforcement, and stimulus fading to increase and maintain a stable rate of compliant behaviour while gradually fading in low-probability requests (Ducharme & Popynick, 1993). ECT initially involves rating tasks and instructions across four levels, with level one comprising of requests in which the child has a high rate of complying with, and level four comprising of requests in which the child has a

low rate or no compliance with (Ducharme & DiAdamo, 2005). Parents and teachers are trained to deliver up to 10 repetitions of each request, starting with level one. Gradually, over several weeks, low-probability requests are slowly faded in, to the point where level four requests are being delivered and are obtaining reliable, compliant responses (Ducharme & Popynick, 1993). Behavioural momentum is created and all requests that are delivered receive a high rate of compliance with minimal errors.

A number of studies have found that ECT is successful at improving compliant behaviour for children with and without developmental and intellectual disabilities (Ducharme & DiAdamo, 2005; Ducharme & Popynick, 1993; Noorland, 2010), but is not successful in improving compliant behaviour for children who have behavioural problems when following requests (Ducharme, 1996). ECT was primarily developed as a non-aversive approach to be used by parents within the home and is also successful within the classroom (Ducharme, 1996; Ducharme, Di Padova, & Ashworth, 2010; Ducharme & Popynick, 1993; Noorland, 2010). While this approach is beneficial because it can be less stressful for parents, and often avoids the problem behaviours that are usually associated with non-compliance such as aggression and distraction, this method also has limitations (Ducharme, 1996). Similar to EID and HPRS, this approach may not be time-efficient within the classroom. Teachers can spend up to six hours learning how to implement this method and then spend a lot of time delivering repetitive instructions to the children who need to increase their rate of compliant behaviour (Ducharme & DiAdamo, 2005). In a study conducted by Rames‐Lapointe et al. (2014), one teacher was dissatisfied with this intervention and rated it as ineffective as it took too much time to learn and implement the intervention. In addition, ECT may not be practical in a classroom setting as this strategy requires that no low-probability requests are issued during level one.

Self-management

Self-management is another antecedent-based intervention which is an effective approach used to improve a range of behaviours, including increasing the rate of compliant behaviour. According to Cooper et al. (2014), *self-management*, as defined within ABA, refers to "the personal application of behaviour change tactics that produce a desired change in behaviour" and is successful once a change in behaviour has occurred (p. 586). Similar to EID, HPRS, and ECT, self-management focuses on modifying behaviour using operant techniques such as stimulus control, prompting, discrimination training, and reinforcement, and is made up of a number of components (Briesch, Daniels, & Beneville, 2019; Carr, Moore, & Anderson, 2014; Cooper et al., 2014; Lower et al., 2016). In contrast to other behavioural interventions, the central idea of self-management is that individuals are responsible for changing their own behaviour by applying all or some of the components in the intervention to themselves. This involves teaching individuals the skills needed to help monitor and change their behaviour rather than primarily having an external control for an entire intervention (Aljadeff-Abergel et al., 2015; Barry & Messer, 2003; Carr et al., 2014; Harris, Danoff, Saddler, Frizzelle, & Graham, 2005; Shogren, Lang, Machalicek, Rispoli, & O'Reilly, 2011).

History of self-management.

Self-management is a positive-behavioural approach which has been used since the 1970s, with increasing popularity over the last 25 years (Briesch et al., 2019; Carr et al., 2014; Lower et al., 2016; Moore, Anderson, Glassenbury, Lang, & Didden, 2013). Initially referred to as self-control or self-monitoring, the inclusive term of self-management is used to describe the techniques an individual can use to modify behaviour (Cooper et al., 2014; Reinecke et al., 2016). While this intervention initially

appeared in literature regarding chronically-ill children as a way to include patients in their own treatment, researchers began to apply this intervention to behaviour as a way to increase desirable behaviours and decrease problem behaviours (Cooper et al., 2014; Lorig & Holman, 2003).

A number of studies have been conducted using self-management as an intervention to modify a wide range of behaviours in a number of situations, including the reduction of unwanted behaviours in schools (Bedesem, 2012; Briesch et al., 2019; Busacca, Anderson, & Moore, 2015; Carr et al., 2014). Self-management interventions are most frequently used to modify on-task behaviour, and is also successful with improving sharing skills, compliant behaviour, and daily living skills, as well as reducing problem behaviours such as inappropriate talking, out-of-seat behaviour, and fidgeting (Briesch et al., 2019; Busacca et al., 2015; Lee, 2016; Pierce & Schreibman, 1994; Reinecke, Newman, & Meinberg, 1999; Stasolla, Perilli, & Damiani, 2014). In addition to being effective with a wide range of behaviours, self-management is also successful with a range of populations from preschool children to adults with a range of abilities including individuals who are typically developing, have developmental disabilities or learning disabilities (Aljadeff-Abergel et al., 2015; Barry & Messer, 2003; Bedesem, 2012; Busacca et al., 2015; Carr et al., 2014; Lui et al., 2014; Moore et al., 2013; Moore, Prebble, Robertson, Waetford, & Anderson, 2001; Palmen, Didden, & Arts, 2008; Shogren et al., 2011; Stasolla et al., 2014).

Components of self-management.

Self-management is made up of a variety of components, each a specific skill that an individual can learn to be competent in applying the intervention to themselves. Generally, the components of self-management can include goal setting, self-monitoring, self-recording, self-evaluation, as well as self-reinforcement, and different

combinations of these components are used in a number of studies (Aljadeff-Abergel et al., 2015; Briesch et al., 2019; Carr et al., 2014; Cooper et al., 2014; Lower et al., 2016; Mooney, Ryan, Uhing, Reid, & Epstein, 2005). While it is possible for an individual to apply the components of the intervention to themselves, external controls such as parents, teachers, researchers, or practitioners can also be involved in the administration of self-management to varying degrees (Cooper et al., 2014). Several studies have researched the efficacy and importance of each of the components and it has been found that the most widely used combination of components is goal setting, self-monitoring, and self-reinforcement (Aljadeff-Abergel et al., 2015; Briesch et al., 2019; Cooper et al., 2014).

Goal setting. Self-management generally begins with setting a specific behavioural goal based on normative levels or personal standards (Aljadeff-Abergel et al., 2015; Barry & Messer, 2003; Cooper et al., 2014; Moore et al., 2001). Goal setting involves identifying a target behaviour that needs to be increased or decreased, determining an ideal level for this behaviour to reach, and then selecting the behavioural changes that are necessary to achieve this goal or objective (Cooper et al., 2014). According to Locke (1996), the goals which are created need to be specific, difficult, but achievable and are more likely to be attained if an individual has a high level of commitment to the goal.

This component of self-management can be effective when conducted by an individual, by external controls or with a combination of the two (Moore et al., 2001). However, Hayes et al. (1985) found that behavioural goals increase in effectiveness when other people are aware of what the goals are, indicating that goal setting is more effective when someone else is involved in creating the goal. According to a number of researchers, setting behavioural goals is an essential component within a self-

management intervention, as a goal provides a standard to evaluate performance against and has been found to be socially acceptable among participants (Aljadeff-Abergel et al., 2015; Bruhn, Vogelgesang, Schabilion, Waller, & Fernando, 2015b; Cooper et al., 2014; Lee & Tindal, 1994; Moore et al., 2001). With self-evaluation, individuals are able to compare their performance and progress to the goals which they have created, to track their change in behaviour (Cooper et al., 2014; Locke, 1996; Moore et al., 2001).

Self-monitoring. The central and most widely used component of a self-management intervention is self-monitoring (Briesch et al., 2019; Busacca et al., 2015). Self-monitoring is a multi-stage component of self-management which includes self-observation as well as self-recording and is "a procedure whereby a person observes their behaviour systematically and records the occurrence or non-occurrence of a target behaviour" (Cooper et al., 2014, p. 598). Self-monitoring was initially developed as a part of clinical assessment for individuals to collect data that only they could observe, and this relatively easy strategy has since become a widely used tool by behaviour analysts (Cooper et al., 2014; Ganz, 2008).

For this component, individuals are taught how to discriminate between appropriate and inappropriate behaviours, as well as how to monitor and record their behaviour, with the aim of regulating behaviour, reaching independence and generalising these skills to other settings (Bruhn, McDaniel, & Kreigh, 2015a; Cooper et al., 2014). Within a self-management intervention, self-monitoring can be effective as a stand-alone intervention (Amato‐Zech, Hoff, & Doepke, 2006), or is often successfully combined with a number of other components (Briesch et al., 2019; Shogren et al., 2011). Self-monitoring is often paired with graphing as a tool used to guide self-evaluation (Moore et al., 2001), and is most commonly paired with prompting procedures (Briesch et al., 2019; McLaughlin, 1983). Prompting during self-

monitoring is generally in the form of audio signals, a visual stimulus, or a tactile prompt and is often necessary during self-monitoring procedures (Reinecke et al., 2016). Prompts can be used to indicate when to monitor behaviour as well as act as a reminder to record behaviour, which in turn can result in the change in behaviour (Briesch et al., 2019; Cooper et al., 2014).

According to Cooper et al. (2014), it is unclear which behavioural mechanisms are responsible for the change in behaviour when self-monitoring is implemented, and it is thought that reactive effects are the reason behind the change of behaviour. Reactivity refers to the influence that measuring behaviour has on the behaviour itself, and in general, the more obtrusive a procedure is, the higher the effect it will have on behaviour (Cooper et al., 2014; Haynes & Horn, 1982). While the aim of research is usually to minimise reactivity, it is thought that individuals monitoring and recording their own behaviour results in a high level of obtrusiveness, and therefore is likely to have an impact on an individual's behaviour (Cooper et al., 2014). It is also theorised that guilt control is a reason behind the effectiveness of self-monitoring. According to Mallot (1981), when monitoring and recording undesirable behaviour, covert guilt statements occur, as it raises awareness that they are not behaving how they should. From this perspective, it is the functional effect to avoid or escape from the guilty feeling, which results in a change in behaviour.

Self-reinforcement. Often paired with goal setting and self-monitoring, self-reinforcement is also a commonly used component of self-management interventions. *Self-reinforcement* refers to the procedure of earning a consequence contingent on behaviour or performance and then applying the consequence to one's self (Aljadeff-Abergel et al., 2015; Cooper et al., 2014; Reinecke et al., 2016). During self-management, individuals can monitor and record their behaviour, evaluate their

behaviour against previously set goals, and then receive reinforcement for achieving these goals. Similar to the other components of self-management, individuals can apply self-reinforcement to themselves, or an external agent such as a teacher, parent, or researcher can give the reinforcement to the individual after the goal is met (Cooper et al., 2014; Lui et al., 2014; Reinecke et al., 2016; Todd, Horner, & Sugai, 1999). In a study conducted by Ballard and Glynn (1975), while academic behaviour did not increase using self-monitoring procedures alone, introducing self-reinforcement to the intervention led to an improvement in behaviour.

While self-reinforcement is successful in creating a change in behaviour during self-management interventions, there is debate regarding whether reinforcement should be delivered based on the precision of self-recording. Some researchers have suggested that the accuracy of self-recording is essential for receiving self-reinforcement (Barry & Messer, 2003; Bruhn et al., 2015a), while other researchers have found that target behaviours still increase regardless of the accuracy of self-recording (Ganz, 2008; Koegel, Koegel, Hurley, & Frea, 1992).

In addition, while the principles of self-reinforcement are considered to be similar to operant reinforcement, there is debate about whether this is true (Cooper et al., 2014). Skinner (1953) and Goldiamond (1976) have argued that while the concept of self-reinforcement does work, the process behind self-reinforcement is more than what occurs with operant reinforcement. From this perspective, we need to take into account the variables controlling the response, as people can deliver reinforcement to themselves regardless of behaviour (Goldiamond, 1976). To be labelled as reinforcement, the contingencies should not be under the individual's control and an independent agent such as another person or machine should deliver the consequences.

According to Goldiamond (1976), labelling the process as self-reinforcement is problematic, as this does not explain the process behind the behaviour change.

Benefits of self-management.

Implementing a self-management intervention provides a number of benefits, especially within a classroom setting. Self-management is ideal within a classroom setting, as it has been found that the intervention is efficient and effective with a range of behaviours and for people with diverse abilities (Barry & Messer, 2003; Cooper et al., 2014; Koegel, Park, & Koegel, 2014). One of the main goals of education is to create independent learners, and numerous studies have indicated that teaching students how to implement this intervention promotes independence, personal control, and helps with self-regulation of behaviour (Barry & Messer, 2003; Harris et al., 2005; Koegel et al., 2014; Lui et al., 2014; Shogren et al., 2011). There is an expectation that students will develop and demonstrate these skills as they progress through education, and so self-management is a valuable tool to learn.

The benefits of implementing a self-management intervention are not only for the individuals using the intervention but also for the people around with them. When students learn to implement the self-management intervention there is a reduction in the time that teachers spend working on individual students' behaviour which gives them more time for skill development and instructional tasks within the classroom (Briesch et al., 2019; Ganz, 2008; Koegel et al., 2014; Rooney & Hallahan, 1988; Shogren et al., 2011). Compared to teacher-directed interventions such as EID, HPRS, and ECT, depending on the teachers' level of involvement, the teacher does not need to spend hours learning how to implement the intervention. In addition, the teacher does not have to focus on applying the intervention during class time for a behaviour change to occur (Cooper et al., 2014). Previous studies have found that self-management has strong

maintenance and generalisation effects as well as high social validity (Cooper et al., 2014; Ganz, 2008; Koegel et al., 2014; Shogren et al., 2011). It has been found that teachers and students often prefer self-administered interventions over teacher-led interventions, and believe that self-management is an appropriate intervention within the classroom (Briesch et al., 2019; Shogren et al., 2011).

Application of Self-management Interventions

On-task behaviour. While self-management interventions are effective in changing a variety of behaviours, on-task behaviour is one of the most commonly targeted behaviours within schools (Briesch et al., 2019). On-task behaviour refers to behaviour which is relevant to an assigned task and generally involves students being seated at their desks, having suitable work materials on their desks, and reading or working on the assigned task (Wilkinson, 2005). On-task behaviour within the classroom is an essential target behaviour for students with and without developmental disabilities. Similar to research regarding compliance, it has been found that targeting on-task behaviour can help students keep up with their workload and high levels of on-task behaviour are correlated with high levels of academic success (Bialas & Boon, 2010; Dougherty, 2018; Holifield, Goodman, Hazelkorn, & Heflin, 2010; Rock, 2005). Additionally, when on-task behaviour is improved, problem behaviours such as inattentive and disruptive behaviours are often reduced (Dalton, Martella, & Marchand-Martella, 1999; Moore et al., 2013). Although some self-management studies have resulted in mixed findings (Dougherty, 2018), a number of studies have found that implementing a self-management intervention to improve on-task behaviour within a classroom setting is successful with typically developing children (Moore et al., 2013; Moore et al., 2001; Rock, 2005), children at risk of developmental delays (Holifield et

al., 2010), and children who have developmental delays (Amato‐Zech et al., 2006; Barry & Messer, 2003; Romans, 2017; Stasolla et al., 2014; Wills & Mason, 2015).

Amato-Zech et al. (2006) conducted a study using self-monitoring with the aim of increasing on-task behaviour within the classroom with three 11-year-old boys who have speech impairments and learning disabilities. In this study, the children were taught how to self-monitor and self-record their on-task behaviour with a tactile prompt. After setting personal behavioural goals, the children recorded whether they were paying attention in class every three-minutes and returned the completed self-monitoring forms to the teacher at the end of each lesson. Overall, on-task behaviour increased from a mean of 55% to more than 90% and the generalisation data, though it was limited, suggested that the intervention benefited the children in other settings. Although no tangible reinforcement was used, on-task behaviour still increased. This study is useful to self-management research as it was found that prompting does not have to be in the form of an audio cue, but that other prompts such as a tactile cue can effectively be used for behaviour change. Prior to this study, prompting devices were generally audio prompts, which can be intrusive and stigmatising in the classroom setting (Amato-Zech et al., 2006).

Compliant Behaviour. While there are only a limited number of self-management studies on the topic, self-management interventions have also been linked to improving the rate of compliant behaviour within the classroom, each using different components of the self-management intervention. Bialas and Boon (2010) studied the effect of self-monitoring on classroom preparedness behaviours, which includes listening, following directions, and staying on task, with three 5-year-old boys who are at risk for developmental disabilities. The study was conducted with a multiple baseline design across participants, and the children learnt to self-monitor and record data to

meet mastery criteria set out for them to receive reinforcement. In this study, the rate of compliance increased for each of the participants.

Additionally, self-management has also been effective with improving the rate of compliant behaviour with children aged seven to nine-years-old who have intellectual disabilities (Wadsworth, Hansen, & Wills, 2015) and children aged five to nine-years-old who have been diagnosed with ASD (Lee, 2016; Lui et al., 2014; Wilkinson, 2005). Lee (2016) studied the effectiveness of a self-management intervention on compliant behaviour with an eight-year-old boy who has ASD. It was hypothesised that the rate of compliance would increase and there would be a concomitant increase in on-task behaviour. A multiple baseline design across classroom settings was used to observe baseline, intervention, fading, and maintenance data within a classroom setting. The student learnt how to self-monitor and record his behaviour on a self-recording form and received reinforcement if the goal was reached. The researcher sat behind the student and physically prompted him to self-record if he did not record his behaviour after a compliant act. After the intervention produced a stable rate of behaviour, fading of the intervention occurred, and a follow-up session was conducted one week later. Overall, the self-management intervention was effective in increasing the rate of compliant behaviour for a child with ASD across all settings, and the rate of on-task behaviour also increased. These results were maintained during the one week follow up. Although the results indicate there was an improvement in compliant behaviour, due to a change in the class schedule, there was insufficient data collected to be able to come to definite conclusions. Also, it is not feasible within a classroom setting to have someone sitting behind a student to deliver physical prompts, and so it is suggested that a discrete method, such as technology, could be used.

The Use of Technology within Behavioural Interventions

Technology is a prominent part of everyday life and over the last few decades has increasingly been used within behavioural research and interventions. While the term *technology* generally refers to the "application of scientific knowledge for practical purposes" (Oxford Dictionaries, 2019, para. 1), within behaviour analysis, technology refers to the devices which are used to "increase productivity and reduce or eliminate manual operations" (Goldsmith & LeBlanc, 2004, p. 166). These devices can be used to make the components of behavioural interventions easier to implement, and include a range of products such as desktop computers, laptops, cell phones, iPods, and tablets (Goldsmith & LeBlanc, 2004; Saini & Roane, 2018). As devices become smaller, cheaper, and more advanced, the popularity of technology within behaviour analysis has increased, as the devices are able to make the implementation of interventions acceptable and more efficient (Mechling, 2007; Reinecke et al., 2016). Researchers, clinicians, parents, and educators are able to use these devices within behavioural interventions to aid in the modification of behaviour. Technology can be included to varying degrees, either being used throughout the whole intervention, or just within aspects of it. Previous studies have indicated that technology is effective as an audio or tactile prompting device, for modelling appropriate behaviour, providing feedback via video, as well as a way to record or evaluate behaviour (Blood, Johnson, Ridenour, Simmons, & Crouch, 2011; Goldsmith & LeBlanc, 2004; Moore et al., 2013).

Self-management and technology.

While self-management has a history of being an effective intervention with a number of populations and behaviours, these interventions are typically implemented using very little technology (Ballard & Glynn, 1975; Barry & Messer, 2003; Lee, 2016; Reinecke et al., 1999; Shogren et al., 2011; Wadsworth et al., 2015). According to

Bruhn et al. (2015b), between 2000 and 2012, only 22 out of 42 self-management studies included technology as a prompting device, while only two incorporated technology as a recording device. Self-management interventions are most commonly implemented with paper and pen recording forms, as well as with physical, verbal, or audio prompts (Barry & Messer, 2003; Blood et al., 2011; Dougherty, 2018; Lee, 2016; Wadsworth et al., 2015). Although these tools have previously been proven to be effective, they have not kept up with technological advances and it has been found that self-management interventions involving little or no technology often have low social validity within research (Crutchfield, Mason, Chambers, Wills, & Mason, 2015; Gulchak, 2008). A number of researchers have noted that using paper and pen recording forms, a physical prompt, or an audio prompt can be intrusive within a classroom setting, causing students to stand out and feel uncomfortable or embarrassed while self-monitoring their own behaviour (Crutchfield et al., 2015; Harris, Graham, Reid, McElroy, & Hamby, 1994; Reinecke et al., 2016).

However, over the last 10 years, there has been a gradual increase in the level of technology used within self-management interventions. Technological devices including cell-phones, pagers, tablets, iPod touches, and iPads are now being incorporated into self-management interventions to varying degrees (Bedesem, 2012; Blood et al., 2011; Bruhn et al., 2015b; Crutchfield et al., 2015; Gulchak, 2008; Moore et al., 2013; Romans, 2017; Vogelgesang, Bruhn, Coghill-Behrends, Kern, & Troughton, 2016; Xin, Sheppard, & Brown, 2017).

Technological devices have been integrated within self-management for video-modelling, goal setting, prompting, recording, and graphing behaviour (Bedesem, 2012; Blood et al., 2011; Bruhn et al., 2015b; Crutchfield et al., 2015; Gulchak, 2008; Romans, 2017; Vogelgesang et al., 2016; Xin et al., 2017). The way in which

technology can be included within self-management interventions as a prompting device has increased as technology has developed. While some studies have used technology as a tactile prompt, such as a MotivAider – a small electronic pager (Amato-Zech et al., 2006; Moore et al., 2013), others have incorporated technology as audio prompts, such as a timer or alarm (Blood et al., 2011; Vogelgesang et al., 2016), or visual prompts, such as a message on a screen (Bedesem, 2012; Romans, 2017).

Technology has also been used for a combination of components throughout self-management interventions. A study conducted by Gulchak (2008) was the first study to integrate technology into a self-management intervention using a handheld device, with an alarm to prompt the recording of on-task behaviour on the device using a stylus. In this study, it was found that using a handheld device as a prompting and recording device effectively increased the on-task behaviour of an eight-year-old male with Emotional Behavioural Disorder (EBD; Gulchak, 2008). More recently, a number of studies have used the web-based applications 'I-Connect' and 'SCOREIT' as a visual prompting and recording device within self-management studies (Bruhn et al., 2015b; Crutchfield et al., 2015; Romans, 2017; Vogelgesang et al., 2016; Wills & Mason, 2015).

There are a number of benefits associated with incorporating technology into self-management interventions. Not only does using a timer-based prompting device reduce the time a teacher spends prompting students to record their behaviour, but the use of technological devices for recording behaviour can also increase the efficiency of data collection, while at the same time reduce the number of errors made when transferring data (Blood et al., 2011; Crutchfield et al., 2015; Vogelgesang et al., 2016). In addition, it has been found that using technology within self-management interventions results in high social validity, as the devices are socially acceptable within

the classroom, are not found to be a distraction, are easy to use, and are more efficient than previously used methods (Bedesem, 2012; Crutchfield et al., 2015; Gulchak, 2008; Vogelgesang et al., 2016; Wills & Mason, 2015; Xin et al., 2017).

However, the use of technology within self-management interventions has been implemented with a limited number of behaviours and populations. Technology has mainly been incorporated into self-management interventions to improve on-task behaviour (Bedesem, 2012; Blood et al., 2011; Bruhn et al., 2015b; Busacca, 2017; Gulchak, 2008; Romans, 2017; Wills & Mason, 2015; Xin et al., 2017), as well as decrease stereotypy behaviour (Crutchfield et al., 2015), and increase independence (Mechling, 2007). Also, previous studies have only shown that the use of technology within self-management interventions is successful with people who have disabilities including ASD, ADHD and EBD (Bedesem, 2012; Blood et al., 2011; Bruhn et al., 2015b; Crutchfield et al., 2015; Gulchak, 2008; Romans, 2017; Wills & Mason, 2015; Xin et al., 2017), with only one study focusing on typically developing children (Busacca, 2017).

Gaps in the Literature

In the past, there has been a vast amount of research conducted implementing self-management to modify behaviour. While a number of studies have focused on increasing the rate of on-task behaviour for individuals with and without disabilities, there are only a limited number of studies which have been conducted to improve the rate of compliance. Of these studies, the majority have focused on children with disabilities (Lee, 2016; Lui et al., 2014; Wadsworth et al., 2015; Wilkinson, 2005), and only one has focused on children who are at risk of developmental disabilities (Bialas & Boon, 2010). To my knowledge, there have not been any studies conducted using a self-management intervention to improve the rate of compliance with typically developing

children. While it is important to implement self-management with children who have disabilities, it is equally important to determine if this type of intervention is effective for increasing the rate of compliance with typically developing children, as they also need help to develop this skill.

In addition, the integration of technology into self-management is fairly new. Over the last 10-years there has been a gradual increase in the types of technology used in self-management interventions, and of the studies conducted, most have focused on improving on-task behaviour with individuals who have disabilities (Bedesem, 2012; Blood et al., 2011; Bruhn et al., 2015b; Crutchfield et al., 2015; Gulchak, 2008; Romans, 2017; Vogelgesang et al., 2016; Xin et al., 2017). These studies have included technology to varying degrees, with only a few using technological devices as a prompting and recording device. To my knowledge there have been no studies conducted implementing a self-management intervention using a technological device for prompting and recording behaviour to increase the rate of compliant behaviour with typically developing children.

Current Study

It is clear that there are gaps in the existing research in relation to self-management and compliant behaviour, specifically with typically developing children. The purpose of the current study is to replicate and extend the work conducted by (Lee, 2016). Lee conducted a self-management intervention with the aim to improve the rate of compliance for an eight-year-old with ASD. In this study, it was found that compliant behaviour increased and there was a concomitant increase in on-task behaviour after the introduction of a self-management intervention.

The aim of the current study is to improve the rate of compliance using a self-management intervention programme with two typically developing children within a

general education setting. Within this study, I also aim to evaluate the use of technology as a prompting and recording device. Overall, it is hypothesised that the implementation of a technology-based self-management intervention will result in an increase in the rate of compliance and a concomitant increase in the rate of on-task behaviour for two typically developing children. In addition, it is also hypothesised that the self-management intervention will have high social validity within a classroom setting.

Method

Participants and Settings

Two typically developing boys and their teacher participated in this study. At the time of recruitment, Liam and David (pseudonyms) were 10-years, 5-months old, and 10-years, 4-months old, respectively. The academic level for Liam was average for his age, while the academic level for David was average for his age in reading, and below average in spelling and maths. Liam and David were recommended to participate in this study by their teacher due to a lower rate of compliance and on-task behaviour compared to their peers. During the initial interview, the teacher reported that Liam often missed instructions or would get distracted during academic activities, while David would get distracted by peers easily and wanted to do things his own way. Liam and David were not diagnosed with any behavioural disorders and were not receiving any additional help for their behaviour at the time they were recruited. During the baseline phase (after session three), both of the participants began taking part in a weekly class-wide mindfulness programme, ‘Pause, Breath, Smile’. This mindfulness programme consisted of weekly 45-minute sessions in which the children were taught mindfulness techniques by another teacher from the school.

The entire research project took place within a primary school setting. While all of the teaching sessions occurred in the staffroom, all of the observations and intervention sessions were conducted within the participants' classroom. The staffroom, situated next to the participants' classroom, was a quiet place to individually work with each of the participants during the teaching sessions. Other adults were around, which ensured that I was not alone with the participants. The classroom consisted of one teacher and 30 students. While the regular classroom teacher was present during the majority of the observations, a reliever teacher taught the class every second Tuesday, when the regular teacher was sick, and when he was on holiday. Overall, the class had a reliever teacher during 37.1% of the observations, during sessions 8, 13-17, and 25-33.

During the preliminary observations, it was identified that compliance and on-task behaviour for Liam and David was the lowest during literacy activities. Therefore, the duration of each observation session was dependent on the length of literacy activities each day (*M*=73 minutes; 45-105 minutes). Literacy activities generally consisted of handwriting, spelling, reading, and independent writing. There was frequent use of technology in the classroom, including iPads, laptops, and desktop computers.

Independent Variable and Dependent Variables

The independent variable for this study was the self-management intervention programme, which included a training session, goal setting, self-monitoring, and reinforcement of behaviour for each of the participants.

The main dependent variable was compliant behaviour, operationally defined as initiating the required response within 10-seconds following the teacher's request. Each time the teacher delivered an instruction, I recorded whether the participants were complying using an event recording data form, and compliant behaviour was displayed

as a percentage of the total instructions delivered. In addition, I recorded the type of instruction that was given. The type of instruction delivered was recorded as either an *undirected request* defined as requests that were addressed to the whole class and were not specific to the individual; *direct request* defined as requests that were directed to the student, as indicated by the teacher directing eye contact to the individual when making the instruction, or the teacher touching the student when making the instruction, or including the student's name in the instructions; or a *routine instruction* defined as an instruction or request that is not said out loud, but the students are expected to follow due to previously set routines, such as the teacher expecting students to silent read immediately after lunchtime.

The second dependent variable was on-task behaviour, operationally defined as behaviour that is relevant to the assigned task, including (but not limited to) sitting appropriately, or physically being in the appropriate place at the right time, and paying attention to or actively working on the task at hand. Every 30-seconds I recorded whether each participant was on-task or not using a momentary time sampling data form, and on-task behaviour was displayed as a percentage of the total observed intervals.

Materials

Teaching materials.

I used a 52-word story to teach each of the participants what compliance is (Appendix K). This story was used in the study conducted by Lee (2016) and was adapted from a story used by Lui et al. (2014). The teacher confirmed in the initial interview that this story would be suitable for Liam and David.

A list of eight role-play situations was used to teach Liam and David how to discriminate between compliant behaviour and non-compliance (Appendix L). The list

of situations and responses were based on the information gathered during the preliminary observations.

I generated a reinforcement survey schedule to determine highly preferred items and rewards for each of the participants (Appendix M). I created a list of seven items, both tangible and social, and left three blank spaces, which gave the participants the opportunity to add to the list. The type of reinforcement provided was selected based on this preference assessment and consisted of items including liquorice, Freddo frogs, M&Ms and fruit bursts.

Technology.

As the observer, I used an iPhone 6s with iOS 12.2 to send prompts from, as a timer, and as a personal hotspot. I used the free iOS application 'Interval Timer' to set a 30-second interval timer to collect momentary time sampling data during the observations. Every 30-seconds the device vibrated, which acted as a tactile prompt to record behaviour. I also used the built-in 'Messages' application to send an iMessage to prompt the participants to record their behaviour. I had the Messages application open on the device during observations, and I sent the prompt 'Are you following instructions?' to the participants when they did not follow an instruction within 10-seconds. I had the personal hotspot from the iPhone 6s enabled to allow the participants' devices to connect to the internet. This ensured each of the devices received the prompts.

Two iPod Touches (6th generation) with iOS 12.2 were used in this research project. Both of the participants had access to an iPod Touch during the intervention to record their behaviour and to receive the visual prompt sent from the iPhone 6s. The application 'StickerPop! Sticker Charts' was used by each of the participants to self-record their compliant behaviour (Appendix N). This application, developed by Rate of

Climb Industries, is priced at $3.49 and is an electronic token board which involves participants selecting a sticker to place on the board each time they follow an instruction. The built-in Messages notification system was used to receive visual prompts, which prompted the participant to record their behaviour on the application. Prior to starting the intervention, I set-up individual email addresses for each of the devices to ensure they only received notifications from my device. These devices were open and unlocked on each of the participants' desks for the duration of the intervention sessions. The iPod feature Downtime was enabled on each of the iPods, which ensured the participants only had access to the self-recording application as well as the Message application for notifications. This meant that the participants could work in a single application without any other distractions and were not able to access any other applications on the device. The only way to turn off 'Downtime' was with a passcode.

Data collection forms.

A revised version of the Functional Assessment Interview (FAI; O'Neill et al., 1997) was used during the initial interview with the teacher to gain an understanding of the participants' behaviour (Appendix J). This form consisted of a series of questions to gather general information about each participant, behavioural excesses, and the function of their behaviour. For each of the participants, the FAI indicated that compliance is a skill deficit that needed to be increased, rather than there needing to be a decrease in problem behaviour.

The data collection forms for this study were adapted from those used by Lee (2016). Preliminary observation data forms enabled me to collect both quantitative and qualitative information regarding normative behaviour and instructions given in the classroom (Appendix O).

Event recording forms were used to collect the number of compliant acts for each participant and two randomly selected peers during each observation session. The percentage of compliant behaviour for each participant and peer was calculated based on this data for each session. In addition, the type of instruction issued was recorded for each instance of behaviour (Appendix P).

Momentary time sampling forms were used to collect data for on-task behaviour for each participant and two randomly selected peers during each observation session. A 30-second interval was used. The percentage of on-task behaviour for each participant and peer was calculated for each session.

A treatment fidelity checklist was adapted from a checklist created by Lee (2016). This checklist was used as a strategy to ensure that the intervention was implemented as planned and was administered in the same way for both participants for the duration of the study (Appendix S).

Intervention rating scales.

The Behavioural Intervention Rating Scale (BIRS; Elliott & Treuting, 1991), was completed by the teacher at the beginning of the study during the preliminary observation phase and at the end of the study during the fading phase (Appendix Q). The BIRS is comprised of 24 six-point Likert scale items and used to gain a measure of social validity.

The Children's Intervention Rating Profile-Adapted (CIRP-A; Turco & Elliott, 1986), adapted by Lee (2016), was completed by Liam and David at the beginning of the study during the teaching phase and at the end of the study after the follow-up phase (Appendix R). The CIRP-A is comprised of seven 6-point Likert scale items and used to gain a measure of social validity.

Research Design

I used a multiple baseline design with a follow-up phase across participants to answer the research question. The introduction of the intervention was staggered across the participants to demonstrate that the expected change in behaviour was due to the intervention rather than extraneous variables. A reversal design was incorporated with one of the participants, for a further demonstration of an experimental effect.

Ethical Approval

The University of Waikato Psychology Research and Ethics Committee granted ethical approval for this research project to be conducted (#18:28). Permission to work in the school was provided by the school's principal, the Board of Trustees, and the classroom teacher. Consent to work with the participants was provided by the teacher, children's parents, as well as assent from the children themselves.

Procedure

Participant recruitment and selection.

Participants for this research project were recruited from a mainstream primary school in Tauranga, New Zealand. I initially called and spoke to several primary school principals throughout Tauranga and sent information sheets and consent forms to those who were interested in having this project conducted in their school. After obtaining informed consent from the principal, a representative from the Board of Trustees, and a teacher from one of the schools (Appendix A-D), I had a face-to-face interview with the teacher about the project and received recommendations for potential participants who had lower rates of compliance and on-task behaviour rates than the rest of the class. I sent hard copies of the advertisement, information sheet, and consent form to the parents of these students (Appendix E, F, G), and invited interested parents to contact me. This enabled me to answer any questions they had and determine the suitability of their child for this research project.

I recruited typically developing children whose parents consented for them to be in the study, who were between 5-10 years old, who did not have a diagnosed behavioural disorder and did not have behavioural help at the time of the study. Children receiving help for their behaviour or had a diagnosed behavioural disorder were excluded from the study. After I gained informed consent from parents, I conducted individual face-to-face meetings with each of the potential participants, read an information sheet to them which explained the research project (Appendix H), and gained informed assent from these children if they wanted to participate (Appendix I).

Data collection.

The entire research project occurred over an 11-week period (excluding school holidays), which resulted in 35 sessions of data collection, and all of the observations occurred in-class in real-time. David was away during three observation sessions (sessions 25, 33, and 34). No other data were missing from either of the participants. I was the primary observer, and stood discretely at the side of the classroom, ensuring I did not disrupt the normal classroom routines.

I conducted preliminary observations over four sessions prior to commencement of the study. In these sessions, I refined the operational definitions of compliance and on-task behaviour, gained a better understanding of the participants' behaviour in the classroom environment, and began to normalise my presence in the classroom. I also collected normative data on the rate of typical compliant and on-task behaviour, as well as the number and type of instructions the teacher gave per session, for the whole class and individual students. The normative data was used to set appropriate goals for the participants during the intervention. To collect the normative data, I randomly selected two different children in each session and recorded their behaviour. I did not collect any identifying information about the randomly selected children.

The normative data was also collected throughout the study. The normative data for compliance was recorded during 13 sessions across the study, at least once per phase, while normative data for on-task behaviour was recorded during every observation session.

Teacher involvement.

I conducted a 40-minute interview with the teacher at the beginning of the study prior to data collection. The purpose of the interview was to gain an understanding of each of the participants' behaviour using the FAI-Revised form. The teacher filled in the BIRS during the preliminary observation phase and at the end of the study during the fading phase. There was no other involvement from the teacher throughout the study, and there was minimal disruption to the classroom routines.

Participant involvement.

Baseline. The baseline phase occurred over 10 sessions for David and 17 sessions for Liam. During this phase, the classroom activities continued as normal and I recorded compliant and on-task behaviour for each of the participants and two of their peers. I continued to collect the baseline data until a stable or deaccelerating trend was apparent.

Teaching. During a 30-minute teaching session I completed a series of tasks with each of the participants. I explained what self-management is and explained what compliance is using a 52-word story. A role-play activity was used to teach each of the participants how to discriminate between compliant behaviour and non-compliance. I acted out different classroom situations and responses, asked the participants to label the behaviours as compliant or non-compliant, and then discussed the answers. A preference assessment in the form of a reinforcement survey schedule was conducted to determine what the participants would like as rewards for reaching goals. This resulted

in a list of four items the participants could choose from in each session. I then introduced and taught the participants to use the self-recording application on the iPod Touch. This consisted of showing the participants how the application worked and getting them to practise placing a sticker on the virtual token board when an instruction was followed. I also demonstrated how the prompt would be displayed on the screen of the device. Liam and David practised with the self-recording device within the classroom, receiving prompts if they did not record their behaviour within 5-seconds. Teaching was complete once they had achieved at least 80% accuracy in two consecutive activities. At the end of the teaching session, I helped the participants fill out the pre-intervention CIRP-A rating scale.

Self-monitoring. The self-monitoring phase was first introduced to David and then Liam. David used the self-recording device for 12 sessions, while Liam used the self-recording device for 13 sessions. Five minutes before the start of each session, I set goals with each of the participants. These goals increased throughout the intervention, beginning with 60% compliant acts per session to 90% compliant acts per session. After setting the goals at the beginning of each intervention session, I gave the self-recording devices to Liam and David, which they placed on their desk. Each time the teacher gave an instruction, the participants recorded their compliant acts by adding a sticker to the electronic token board. If a participant did not self-record compliant behaviour within 10-seconds of an instruction, I sent a visual prompt to that participant's device. Failure to comply with instructions was ignored. At the end of each session, I reviewed each of the participants' devices and let them choose a reward from the established list if they had met the pre-set goal. A brief reversal phase occurred for David. David returned to baseline for three sessions from session 23 and then the intervention was reinstated from session 27 for five sessions.

Fading and follow-up. After a stable rate of compliance was obtained during the intervention phase for both Liam and David, fading occurred gradually over five sessions for Liam, and within one session for David (due to his absence from school for two observation sessions during this phase). For David, fading involved removing the self-recording device and asking the participant to mentally tally the number of compliant acts he completed, and then receiving reinforcement for reaching a pre-set goal. For Liam, this fading involved removing the self-recording device in session one, continuation of the device in session two, and then removing the device in session three, four and five. Liam mentally tallied the number of compliant acts during sessions one, three, four and five, and I shifted the rewards from tangible reinforcement to positive praise during session three to five. A follow-up session occurred two weeks after the last fading session, which had the same conditions as the baseline phase. After the follow-up session, I helped the participants fill out the post-intervention CIRP-A rating scale.

Measures of Validity and Reliability

Treatment fidelity.

Treatment fidelity was measured throughout the intervention and fading phases of this research project. During these phases, at the end of each observation session I completed the treatment fidelity checklist, which ensured that I was administering the intervention in the same manner for each participant during every session. Treatment fidelity was calculated and displayed as the percentage of total items on the checklist delivered correctly. The mean treatment fidelity for the entire intervention was 100%.

Social validity.

The BIRS and the CIRP rating scales were used to gain a measure of social validity from the teacher and participants, respectively. These rating scales were

completed as a pre- and post-measure to the intervention and were used to gain an understanding of how the teacher and participants perceived the self-management intervention. This included the perceived acceptability and effectiveness of the intervention within the classroom environment (Elliott & Treuting, 1991; Turco & Elliott, 1986). The social validity of this intervention was calculated by totalling the items on the rating scales and then comparing the pre- and post-measures.

Inter-observer agreement.

Inter-observer agreement was calculated to assess the reliability and accuracy of the observation data. An independent second observer attended 20% of all the observation sessions, which was at least once per phase and occurred when the second observer was available to attend the scheduled observation sessions. This second observer was a postgraduate psychology student who was briefed about the operational definitions of compliant and on-task behaviour and shown how to record the data. During these observation sessions, the primary and secondary observers individually collected data, and then the data was compared at the end of each session. Inter-observer agreement was calculated on a trial-by-trial basis for compliant behaviour, and an interval-by-interval basis for on-task behaviour, by calculating the total number of agreements divided by the total number of agreements and disagreements, multiplied by 100. The mean inter-observer agreement for compliant behaviour was 98.2% (87.5%-100%), and the mean inter-observer agreement for on-task behaviour was 94.5% (91.5%-96.8%), indicating consistent and accurate data collection. According to Cooper et al., (2014), inter-observer agreement between 80-100% is considered adequate reliability, with scores above 90% increasing the confidence that the data accurately reflects the changes in behaviour.

Data Analysis

I recorded the data and produced graphs using Microsoft Excel. I then analysed the data using visual analysis, as this is the primary method of analysis used in single-case experimental designs (Lane & Gast, 2014).

Visual analysis involved the analysis of the data within- and between-conditions. According to Lane and Gast (2014), within-condition analysis involves evaluating the data patterns in each condition individually, including the trend, level, and stability of the data, while between-condition analysis involves comparing the data in one condition to the data in another, such as from the baseline to the intervention. Visual analysis was ideal for this research project as it allowed me to evaluate the participants' performance after every session, which guided my decisions during data collection, including how long to keep each participant in the baseline condition, or when to introduce or remove the intervention.

The criteria set out by What Works Clearinghouse (WWC; Clearinghouse, 2017) was used to determine whether an experimental effect occurred. Between-condition analysis included determining the size of the effect for the intervention by calculating the percent of non-overlapping data (PND) and Kendall's TAU-U. PND refers to the percentage of intervention data points which exceeded the baseline data points, and this provided an indication of the effectiveness of self-management as an intervention (Scruggs, Mastropieri, & Casto, 1987). According to Scruggs and Mastropieri (1998), PND scores below 50% indicate ineffective interventions, scores from 50-70% indicate the intervention was questionable, scores of 70-90% indicate the intervention was effective, and PND scores above 90% indicate the intervention was very effective. For the calculation of the PND for Liam, an outlier was removed (session 2 = 100%). This data point was removed as Liam was not doing literacy activities during this data

collection session, and the data point exceeded the 75th percentile of the data. In addition, the Kendall's Tau-U was calculated as a measure of effectiveness for the intervention, which is a parametric statistical test that accounts for outliers and the trend of the data (Brossart, Laird, & Armstrong, 2018; Parker, Vannest, Davis, & Sauber, 2011). According to Brossart et al. (2018), the Tau-U effect sizes range from -1 to +1, with scores close to -1 indicating a strong negative effect, scores of 0 indicates no effect, and scores of +1 indicating a strong positive effect.

Results

Compliance

The primary dependent variable was compliant behaviour. Figure 1 illustrates the percentage of compliant behaviour for each session across conditions for the participants and includes the mean normative data for compliant behaviour of two of the participants' peers. The mean normative compliant behaviour remained stable and high (M=99%, 92%-100%) throughout the study with a zero-celerating trend. A reliever teacher was present in 37.1% of the observation sessions (sessions 8, 13-15, 25-33).

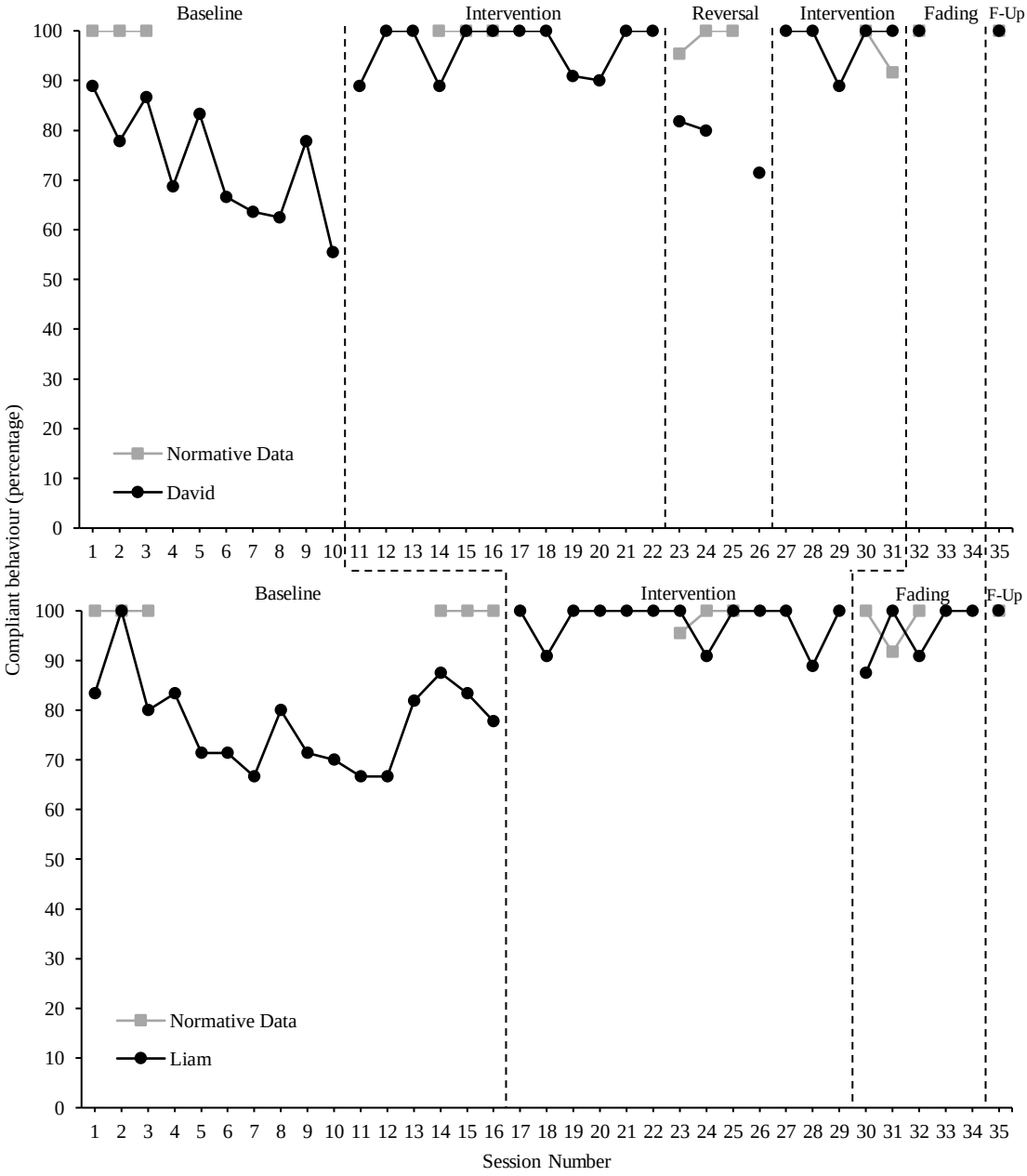

Figure 1. Percent of compliant behaviour per session across conditions for each participant and their peers. Reliever present in sessions 8, 13-15, 25-33.

David. During the initial baseline phase, David's compliant behaviour showed a variable decelerating trend with a mean of 73.2% (55.6%-88.9%). After the introduction of the self-management intervention, his level of compliant behaviour increased to a mean of 96.6% (88.9%-100%) and showed a stable accelerating trend. Once the intervention was removed during the reversal phase, David's level of compliant

behaviour showed a stable deaccelerating trend and decreased to a mean of 77.8% (71.4%-81.8%). His level of compliant behaviour increased again with the reinstatement of the intervention to a mean of 97.8% (88.9%-100%) and a stable zero-celerating trend. David's level of compliant behaviour remained high during the fading phase at 100% and was maintained two weeks later during the follow-up phase at 100%.

***Liam*.** During the baseline phase, Liam's compliant behaviour showed a variable decelerating trend with a mean of 77.6% (66.7%-100%). After the introduction of the self-management intervention, his level of compliant behaviour increased to a mean of 97.8% (88.9%-100%) and showed a slightly decelerating trend. His level of compliant behaviour slightly decreased but remained high with a stable, accelerating trend during the fading phase with a mean of 95.7% (87.5%-100%). His high compliant behaviour was maintained two-weeks later in the follow-up session at 100%.

***Effect* Size.** The PND and the Tau-U were calculated to determine whether the intervention was effective at improving Liam's and David's compliant behaviour. The PND for Liam was 100%, while the mean PND for David was 94.4% (83.3%-100%). These scores indicate that the intervention was a very effective way to increase both of the participants' compliant behaviour (Scruggs & Mastropieri, 1998). In addition, the Tau-U for Liam's compliant behaviour was 0.92 (95% CI [0.507,1.493]), while the Tau-U for David's compliant behaviour was 0.99 (95% CI [0.514,1.486)]. These results are in line with the results of the PND, showing the majority (92% and 99% respectively) of the data did not overlap and indicating that the intervention had strong effects on the participants' compliant behaviour.

On-task Behaviour

On-task behaviour was concomitantly measured. Figure 2 depicts the percentage of on-task behaviour for each session across conditions for each participant and includes

mean normative data from two of the participants' peers on-task behaviour in the classroom. The mean normative on-task behaviour remained stable and high (*M*=96.7%, 81.9%-100%) throughout the study with a slightly decelerating trend.

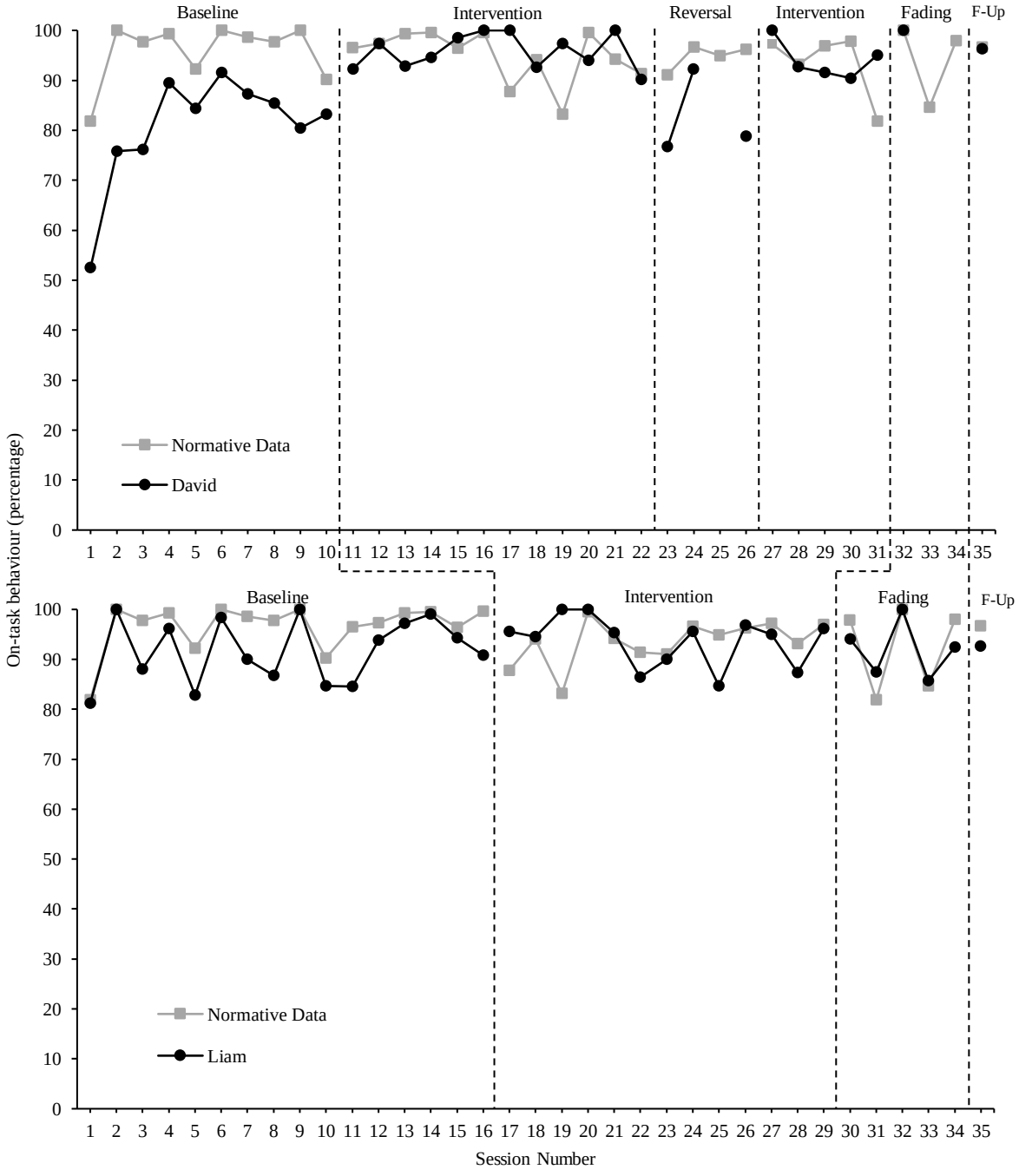

Figure 2. Percent of on-task behaviour per session across conditions for each participant and their peers. Reliever present in sessions 8, 13-15, 25-33.

***David*.** During the baseline phase, David's level of on-task behaviour was variable with a mean of 80.6% (52.5%-91.5%) showing an accelerating trend. Upon the

introduction of the intervention, his level of on-task behaviour increased to a mean of 95.8% (90.2%-100%) with a stable zero-celerating trend. When the intervention was removed for the reversal phase, his level of on-task behaviour decreased to a mean of 82.6% (76.7%-92.2%) with a variable deaccelerating trend. Once the intervention was reinstated, David's on-task behaviour increased again to a mean of 93.9% (90.4%-100%) and showed a stable decelerating trend. During the fading phase, his level of on-task behaviour increased to 100% and this was maintained two weeks later during the follow-up phase at 96.3%.

***Liam*.** During the baseline phase, Liam's level of on-task behaviour was stable and high with a mean of 91.7% (81.3%-100%) and a slightly accelerating trend, reaching 100% on-task during two sessions (session 2 and 9). After the introduction of the self-management intervention, his level of on-task behaviour slightly increased to a mean of 93.7% (84.7%-100%), showing a stable zero-celerating trend. During the fading phase, his level of on-task behaviour remained high and stable with a mean of 92% (85.7%-100%) showing a decelerating trend, and this was maintained two-weeks later during the follow-up phase at 92.6%.

***Effect* Size.** The PND and the Tau-U were calculated to determine whether the intervention was effective for improving Liam's and David's on-task behaviour. The PND for Liam was 0%, while the mean PND for David was 72.8% (60%-91.7%). These scores indicate that while there was no observed effect of the intervention on Liam's on-task behaviour, the intervention was effective at increasing David's on-task behaviour (Scruggs & Mastropieri, 1998). In addition, the Tau-U for Liam's on-task behaviour was 0.15 (95% CI [-0.281,0.579]), while the Tau-U for David's on-task behaviour was 0.89 (95% CI [0.610,1.390)]. These results show that while only 15% of the data did not overlap between the baseline and intervention for Liam, 89% of the data did not overlap

between the baseline and intervention for David. In line with the PND, these results suggest that the intervention had no effect on Liam's on-task behaviour, while the intervention was effective with increasing David's on-task behaviour.

Social Validity

The CIRP and the BIRS were administered to gain a measure of social validity. The scores from the pre- and post-measures were compared and used to determine the acceptability and perceived effectiveness of the self-management intervention in a classroom setting. The total possible score for the CIRP is 42 while the total possible score for the BIRS is 144.

Participants' perceptions.

Liam's total score on the CIRP increased 22.6%, from a pre-measure score of 31 to a post-measure score of 38, while David's total score increased 8.57%, from a pre-measure score of 35 to a post-measure score of 38. Both of the participants had a positive attitude towards the intervention during the pre-measure and post-measure questionnaires, with Liam and David 'strongly agreeing' that this intervention seemed to be a fair way to help improve their behaviour (item 1), and 'agreeing' that this intervention would help them do better in school (item 7).

David's perception of this intervention slightly changed with exposure to the intervention, with 42.9% of the items increasing by one point, and 57.1% of the items on the questionnaire remaining the same. His rating for item 5 "The method will help other children too" shifted from 'slightly disagree' to 'slightly agree', and his rating for item 2 "The method is too hard for me" moved from 'disagree' to 'strongly disagree'. In addition, during the post-measure, David 'strongly agreed' that he liked the self-management intervention (item 6), and 'strongly disagreed' that the intervention would cause some problems with his friends (item 3).

Liam's perception of this intervention also changed with exposure to the intervention, with 71.4% of the items increasing by one or more points and 28.6% items on the questionnaire remaining the same. His rating for item 2 "This method is too hard on me" shifted from 'agree' to 'disagree', and his rating for item 3 "The method will cause me some problems with my friends" moved from 'disagree' to 'strongly disagree'. During the post-measure, Liam 'strongly agreed' that he liked the self-management intervention (item 6).

Teacher's perceptions.

The teacher's total score on the BIRS increased by 14.3%, from a pre-measure score of 91 to a post-measure score of 104. While the teacher's perception of the intervention was generally positive in the pre-measure questionnaire with scores ranging from 'slightly disagree' to 'agree', overall his perception of the intervention shifted in a positive direction in the post-measure questionnaire with 58.3% of the items increasing by one or two points, and 41.7% of the items remaining unchanged. This increase indicated that the teacher's perception of the self-management intervention slightly improved with exposure to the intervention.

There was a shift in the teacher's perception of the acceptability after exposure to the self-management intervention. His rating for item 4 "I would suggest the use of this intervention to other teachers" shifted from 'slightly disagree' to 'agree'. In addition, in the post-measure, he 'strongly agreed' that he was willing to use this intervention in the classroom (item 7), and that the self-management intervention was a fair way to handle compliant behaviour (item 11), as well as 'agreed' that this intervention would be suitable for a variety of children (item 9), and that he liked the procedures used in the intervention (item 13). These scores indicate that the teacher considered self-management to be acceptable to use in the classroom environment.

There was also a slight change in the teacher's perceived effectiveness with exposure to the intervention. His rating for item 3 "This intervention should prove effective in changing the child's problem behaviour" moved from 'slightly disagree' to 'slightly agree'. In addition, in the post-measure, his perception shifted to 'slightly agreed' that he noticed a positive change in compliant behaviour soon after the intervention (item 19), and that the participants' behaviour compared favourably to their peers (item 22). However, in the post-measure the teacher's perceptions remained the same with a few items in that he 'slightly disagreed' that the intervention produced a lasting improvement (item 17), and that behaviour change would be maintained or generalised (items 20, 21).

Additional Measures

Instructions delivered.

Figure 3 demonstrates the percentage of directed, undirected, and routine instructions delivered for each of the participants across conditions. The type of instruction was recorded each time an instruction was delivered and calculated into percentages per phase. Of the instructions delivered to the participants' peers during the normative data collection, 9.36% were directed instructions, 83.7% were undirected instructions and 8.32% routine instructions.

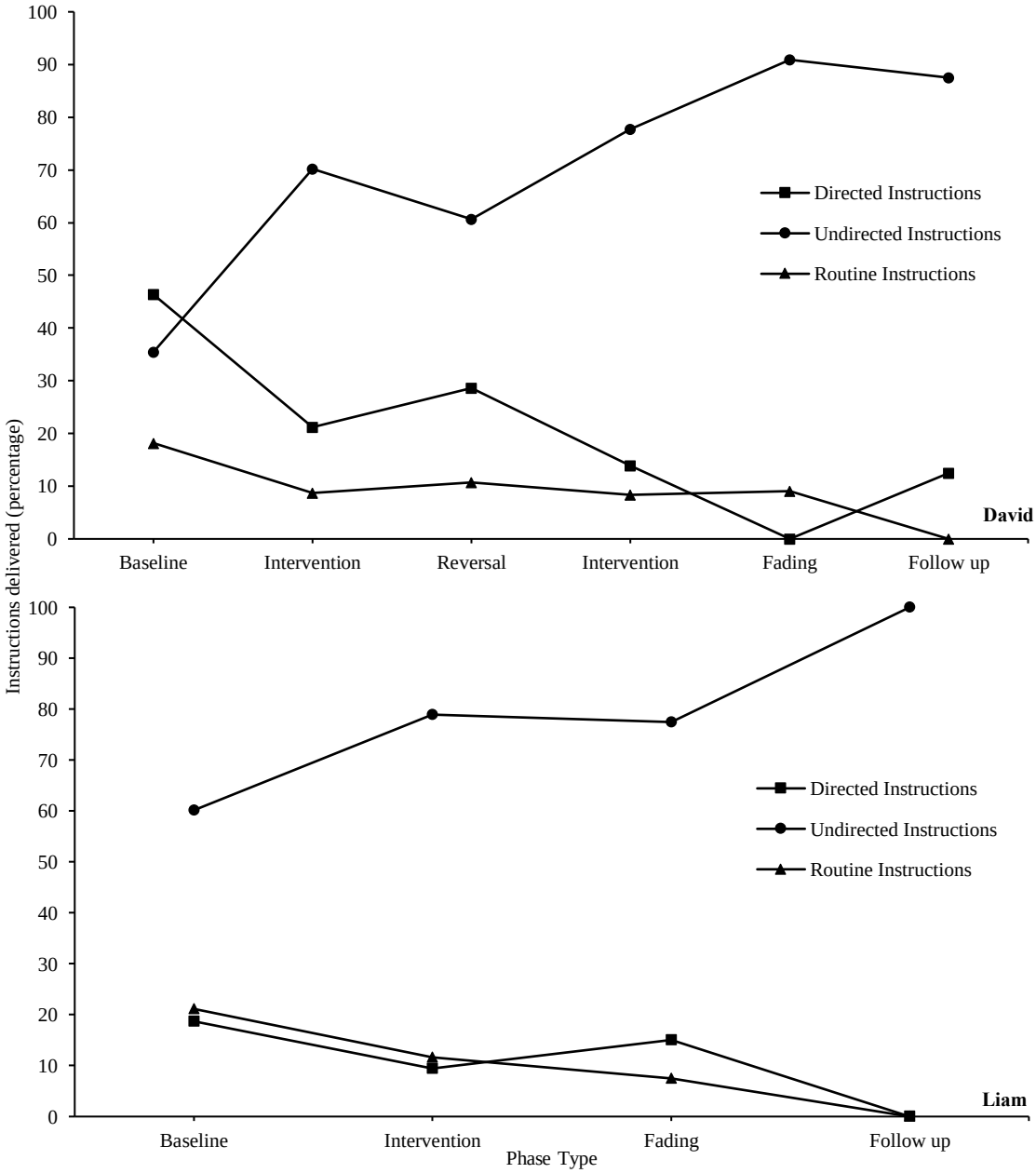

Figure 3. Percentage of directed, undirected, and routine instructions delivered across conditions for each participant.

David. As can be seen in Figure 3, within the baseline phase, 46.4% of the instructions delivered to David were directed instructions, 35.5% were undirected instructions, and 18.2% were routine instructions. After the initial introduction of the intervention, the percentage of directed instructions delivered to David decreased to 21.2%, undirected instructions increased to 70.2%, and routine instructions decreased to

8.65%. During the reversal phase, the number of directed instructions delivered to him slightly increased to 28.6%, undirected instructions decreased to 60.7%, and routine instructions slightly increased to 10.7%. At the reinstatement of the intervention, directed instructions delivered to David further decreased to 13.9%, undirected instructions further increased to 77.8%, and routine instructions slightly decreased to 8.33%. During the fading phase, the percentage of directed instructions delivered to David decreased again to 0%, undirected instructions further increased to 90.9%, and routine instructions slightly increased to 9.09%. In the follow-up session, 12.5% of the instructions delivered to David were directed, 87.5% were undirected, and 0% were routine instructions.

***Liam*.** During the baseline phase, 18.7% of the instructions delivered to Liam were directed instructions, 60.2% were undirected instructions, and 21.1% were routine instructions. After the introduction of the intervention, the percentage of directed instructions delivered to Liam decreased to 9.5%, undirected instructions increased to 78.9%, and routine instructions decreased to 11.6%. During the fading phase, the percentage of directed instructions for Liam slightly increased to 15%, undirected instructions slightly decreased to 77.5%, and routine instructions also decreased to 7.5%. In the follow-up session, the percentage of undirected instructions delivered to Liam increased again to 100%, while directed and routine instructions decreased to 0%.

Treatment integrity.

Figure 4 displays the number of prompts delivered, the goals set, and the number of items self-recorded in each session of the intervention phase for each participant.

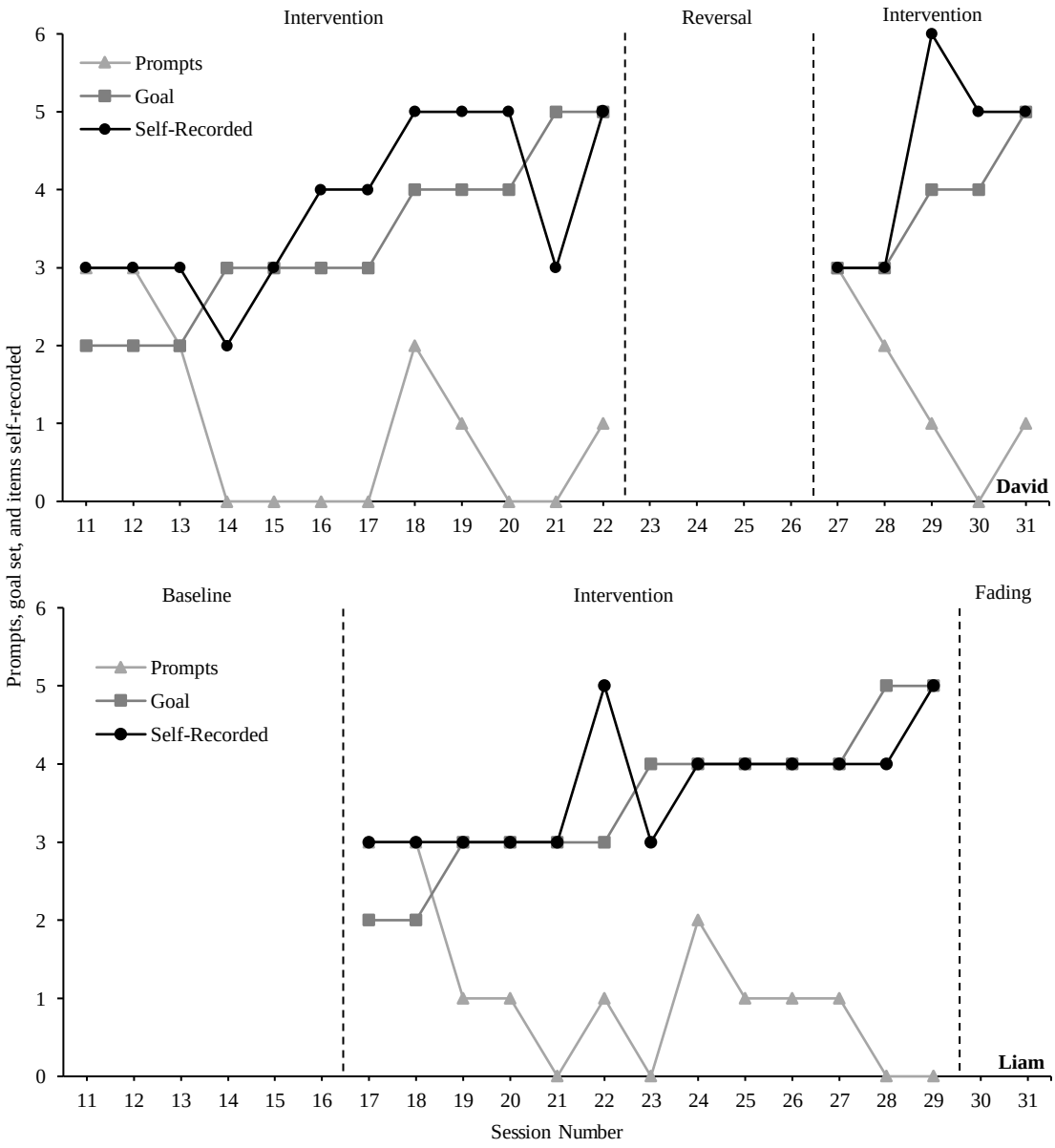

Figure 4. Number of prompts delivered, goals set and items self-recorded by each of the participants for each session during the intervention condition.

As can be seen in Figure 4, during the intervention phase, the number of prompts delivered to Liam (M=1.07) and David (M=1.11) had a decreasing trend with increasing exposure to the intervention. In addition, as the goal for the number of compliant acts in each session increased in trend throughout the intervention sessions, the number of items self-recorded by each of the participants also had an increasing

trend. Liam reached his goal in 61.5% of the intervention sessions, exceeded his goal in 23.1% of the intervention sessions and did not reach the goal in 15.4% of the intervention sessions. David reached his goal in 29.4% of the intervention sessions, he exceeded his goal in 58.8% of the intervention sessions and did not reach the goal in 11.8% of the intervention sessions.

Discussion

The purpose of this study was to systematically replicate and extend a study conducted by Lee (2016), who increased the compliant and on-task behaviour of a child with ASD using a self-management intervention. In this study, I aimed to increase compliant behaviour using a self-management intervention programme with typically developing children in a general education setting and monitor the effects in on-task behaviour. In addition, I aimed to evaluate the use of technology within this intervention as a prompting and recording device. A multiple baseline design with a follow-up phase across participants was used, and a reversal design was incorporated with one participant (A-B-C and A-B-A-B-C).

I hypothesised that the implementation of a technology-based self-management intervention would result in an increase in compliant behaviour and have concomitant increases in on-task behaviour with two typically developing children. I also hypothesised that this study would have high social validity. Overall, I found that the results of this study supported both of the hypotheses.

Self-management and Compliant Behaviour

The main finding of this study was that compliant behaviour increased with the implementation of the technology-based self-management intervention, supporting the hypothesis. While both of the participants followed fewer instructions than their peers

during the baseline phase, Liam and David's rate of compliant behaviour immediately increased and matched their peers' after they started using the self-management intervention (Figure 1). Their level of compliant behaviour remained close to their peers' during the fading and follow-up sessions.

Throughout this study, most of the environmental conditions were held relatively constant, indicating that it is likely that any change in compliant behaviour was a result of the manipulation of the intervention. Each observation session was conducted in the same classroom, at the same time of day, while the students were completing literacy activities. In addition, although a reliever teacher was present in 37.1% of the observation sessions, a change of teacher did not appear to have a significant impact on Liam and David's compliant behaviour. Their behaviour remained relatively stable regardless of which teacher delivered the instructions (see Figure 1). One factor which could have impacted the results is a possible change in the number of instructions delivered by the teacher. While I did not have complete control over environmental conditions in the applied setting, keeping the environmental conditions as stable as possible minimised the impact of extraneous and confounding variables on Liam and David's compliant behaviour. Consequently, these conditions strengthened the demonstration of a functional relationship between the self-management intervention and compliant behaviour (Cooper et al., 2014).

The findings in this study demonstrate a moderate experimental effect (Clearinghouse, 2017). David's level of compliant behaviour immediately increased after the introduction of the self-management intervention and these results were replicated with Liam's behaviour at a separate time. According to the criteria set out by the WWC (Clearinghouse, 2017), a strong demonstration of an experimental effect in a multiple baseline design requires at least three replications of the effect at different

points in time. As there were only two participants in this study, and therefore only two demonstrations of an experimental effect, the decision was made to incorporate a brief reversal phase with one of the participants. An additional demonstration of the experimental effect occurred when David's compliant behaviour decreased after the intervention was removed and then increased again with the reinstatement of the intervention. Alongside a moderate demonstration of an experimental effect, the PND and Tau-U calculations indicate that the intervention was reliable and highly effective in increasing Liam and David's compliant behaviour. These findings build on the existing knowledge that compliance is a skill that can be taught.

The findings of this study are line with previous research (Bialas & Boon, 2010; Lee, 2016; Wadsworth et al., 2015; Wilkinson, 2005), in that they too found that compliant behaviour reliably increased after the introduction of a self-management intervention. The current study extends the previous self-management research in two ways. While previous studies have used various paper and pen methods to self-record compliant behaviour within the self-management intervention, the current study demonstrates that a technology-based self-management intervention is also effective in teaching the skill of compliance. In addition, while previous studies have focused on children diagnosed with ASD (Lee, 2016; Wilkinson, 2005) and children at risk of developmental disabilities (Bialas & Boon, 2010), this study adds to the research base by showing that self-management is also effective in increasing the rate of compliance in typically developing children.

In contrast, the findings of this study contradict the suggestions from previous literature. McMahon and Forehand (2003) have specified that an ideal level of compliance is between 60% and 90%, with the thought that a compliance rate of 100% is not adaptive. While previous self-management studies (Lee, 2016; Wadsworth et al.,

2015) have attained results in line with these suggestions, this level of compliance does not take in to account normative classroom data, teacher expectations, and specific contexts, including what was normal in this classroom. Liam and David's baseline levels of compliance were situated between 60% and 90%; however, their levels were distinctly lower than those of their peers, thus demonstrating a need for intervention. After the self-management intervention was introduced, each of the participants achieved compliance rates close to 100%, consistent with classroom norms. These results are similar to the findings achieved by Lui et al. (2014) and Bialas and Boon (2010), who also attained compliance levels close to 100%.

Although it is not always adaptive to have compliance rates at 100%, in classrooms which are well-run with clear instructions, such as the one in this study, an expectation of 100% compliance is appropriate. In line with EID research (Dufrene et al., 2012; Ford et al., 2001; Lui et al., 2014), high rates of compliant behaviour have been linked to the way in which instructions are delivered. In this study, the teacher delivered direct and clear instructions to his students while holding eye-contact with those he was talking to, leading to high rates of compliance throughout the classroom. Overall, these findings highlight the importance of collecting normative classroom data. While compliance levels of 60% to 90% are suitable in some situations, collecting normative data helps to determine the ideal level of compliance within specific contexts.

On-task Behaviour

In addition to an increase in compliance, it was expected that a self-management intervention targeted towards compliant behaviour would result in a concomitant increase in on-task behaviour for each of the participants. The findings show mixed results. While David's on-task behaviour increased to a similar level to his peers when the self-management intervention was first introduced, and again when the intervention

was reinstated, Liam's level of on-task behaviour was at a similar level to his peers during the baseline condition and remained similar throughout the study (Figure 2).

Subsequently, the PND and Tau-U calculations indicate that targeting compliant behaviour with a self-management intervention was effective in concomitantly increasing David's on-task behaviour and was not effective with Liam's on-task behaviour. The results show that Liam reached 100% compliance during two of the baseline sessions. A possible explanation for a lack of increase in Liam's on-task behaviour is that he encountered a ceiling effect, as he was already exhibiting high levels of on-task behaviour which were consistent with the classroom norms (Cooper et al., 2014).

The concomitant increase in David's on-task behaviour is in line with previous research (Bialas & Boon, 2010; Lee, 2016), who also found that self-recording compliant behaviour resulted in an increase in on-task behaviour. While a number of studies have found that the on-task behaviour of typically developing children increases with a self-management intervention (Moore et al., 2013; Moore et al., 2001; Rock, 2005), these previous studies monitoring concomitant effects in on-task behaviour were conducted with children who have ASD and are at-risk of developmental disabilities. The current study extends these findings by indicating that a similar effect is possible with typically developing children. Overall, these findings add to the limited knowledge base, demonstrating that when compliant behaviour and on-task behaviour are at low rates, self-recording compliant behaviour can have an indirect effect with on-task behaviour.

Social Validity

At the beginning of the study, the teacher and participants each rated the self-management intervention positively in terms of the acceptability and effectiveness of

the intervention. At the end of the study, their perceptions of the intervention remained positive. In line with the hypothesis and previous studies (Lee, 2016; Shogren et al., 2011), these findings indicate there was a high level of social validity for the self-management intervention within a school setting. Building on the existing evidence, this study indicates that a self-management intervention was perceived as a highly acceptable and feasible intervention with typically developing children. Furthermore, this study provides evidence of the idea that using technology within a self-management intervention is acceptable and effective within a classroom environment.

Overall, the participants each indicated that they strongly agreed to liking the self-management intervention and thought that it would help them to develop the skill of compliance. In addition, the teacher was willing to use this intervention in his classroom and was prepared to suggest this intervention to other teachers. The positive perception from the teacher could be related to the decrease in the amount of time spent focusing on the participants' behaviour. After the intervention was introduced, the types of instructions delivered to the participants closely matched their peers. The percentage of instructions the teacher-directed towards the participants decreased and the percentage of undirected instructions delivered to the participants increased (Figure 3). These findings indicate that after the intervention was in place, the teacher spent less time attending the behaviour of the participants and was providing a similar amount of attention to the participants and their peers.

Interestingly, the teacher slightly disagreed that the participants' behaviour would be maintained over time and generalised across settings. These ratings could have occurred due to the lack of generalisation data and maintenance data collected, or because the teacher was absent from the classroom in a number of the sessions towards the end of the study (sessions 25-33). However, the data shows the increase in the rate

of compliance and on-task behaviour for David, was maintained after the intervention was removed during the fading phase, and two weeks later in a follow-up session.

Treatment Integrity

In this study, the treatment fidelity was 100%, indicating that the self-management intervention was implemented exactly as planned during each data collection session. A high treatment fidelity also suggests that the technology-based self-management intervention was easy to implement.

Liam and David each used an iPod touch to receive visual prompts and to self-record their behaviour in the StickerPop! application. The results show that the number of visual prompts delivered to the participants decreased throughout the study. In addition, the number of compliant acts the participants self-recorded was always equal to or higher than the number of prompts received (Figure 4), showing that they were not relying on the prompts to self-record their behaviour.

In this study, a visual prompt was effectively used. This is consistent with previous research (Bedesem, 2012; Romans, 2017), who also found that a visual prompt was an effective method to prompt participants to record their behaviour. Although tactile (Moore et al., 2013), verbal (Gulchak, 2008), and physical prompts (Lee, 2016) are the most common type of prompts used in self-management interventions, these findings show that visual prompts are also an effective method to prompt behaviour. Visual prompts are discrete, which is beneficial within a classroom environment.

Furthermore, the successful use of technology as a recording device is in line with previous research (Bruhn et al., 2015b; Crutchfield et al., 2015; Romans, 2017; Vogelgesang et al., 2016; Wills & Mason, 2015), who have also found that technology has been effective as a self-recording device within self-management interventions. These previous studies have incorporated technology into self-management

interventions to increase on-task behaviour with individuals who have disabilities. To my knowledge, this is the first study conducted incorporating technology to increase the compliant behaviour of typically developing children. The findings from this study provide new evidence that a technology-based self-management intervention can successfully be used by typically developing children. Overall, this is a step forward in the use of technology within behavioural interventions.

Theoretical and Practical Importance

The findings of this study indicate that compliance is a skill that can be taught to typically developing children using a technology-based self-management intervention programme. It was found that the intervention effectively increased the target behaviour over a relatively short period of time for the students in this study. This finding builds on the existing evidence that addressing compliance as a skill which can be learned is helpful within school settings.

In addition, the findings from this study also indicate that by targeting compliant behaviour, on-task behaviour can concomitantly increase. This is beneficial from an education perspective, as it shows that by targeting one behaviour with a self-management intervention programme, there is a possibility to also improve closely related behaviours.

Furthermore, the practical importance of these findings is two-fold. Not only does teaching compliance as a skill help to develop student independence (Barry & Messer, 2003), but the successful implementation of a self-management intervention suggests that this intervention could be applied classwide within school settings.

Strengths

The main strength of this research was that implementing the self-management intervention led to an improvement in Liam and David's compliant behaviour, as well

as an improvement in David's on-task behaviour. Both of the participants were able to develop the skill of compliance by self-monitoring their behaviour. With this skill, there is a possibility that the participants will extend their behaviour to other situations.

Another key strength of this study was that the self-recording technology was easy for the participants to use, as evidenced by the treatment integrity and social validity data. Both participants rated the intervention easy, as well as reporting that they liked using the intervention. The ease of use was beneficial for this study as it did not take much time to teach each of the participants how to use the self-recording application.

Finally, another strength of this study was using a single-case research method. A single-case research method enables researchers to closely monitor each of the participants' behaviour and make decisions based on their data after each session (Cooper et al., 2014). In this study, this enabled me to decide when to implement and remove the intervention as well as when to begin fading the sessions. Additionally, closely monitoring the data allowed me to add a brief reversal phase for one participant to strengthen the demonstration of an experimental effect between the self-management intervention and compliant behaviour.

Limitations and Future Research

One limitation of the study was that the type of technology used to self-record compliant behaviour was not very portable. While an iPod Touch is discrete, easy to use, acceptable and effective in the classroom environment, this device was inconvenient when the participants moved between desk work and sitting on the floor. When Liam and David did not have the device next to them after following an instruction, they self-recorded their behaviour the next time they were with the device. Although this method did not have an impact on the number of times that behaviour

was self-recorded, the study may have benefited from utilising wearable technology, such as a smartwatch. At the time of the data collection, an appropriate application for self-recording on a smartwatch was not found, which is why the decision was made to use an iPod touch. Wearable technology with an appropriate application would enable the participants to have the device with them at all times to receive prompts and record their behaviour.

Secondly, due to the variable way in which instructions were delivered to students, the method of prompting the participants required the presence of the researcher in the classroom, which is not feasible in education settings. As the participants self-recorded their behaviour each time they followed an instruction, time-based prompts, such as those used when participants self-record on-task behaviour (Moore et al., 2013) could not be used. This is a limitation as although visual prompts are discrete, the prompts were still dependent on a researcher being present. Future studies could explore the effectiveness of this intervention without prompts. This improvement would make the technology-based self-management intervention more feasible to use in classroom settings.

Finally, the study could benefit from a longer follow-up phase as well as a generalisation phase. Due to time constraints, the follow-up phase only included one data collection point, and there was no generalisation phase within this study. Although the results indicate that the effect of the intervention was maintained after a two-week period, the maintenance data would be stronger if this was collected after a longer period of time. In addition, including a generalisation phase would help to determine whether the findings would extend to different settings. While the teacher slightly disagreed that the effects of this intervention would be maintained or generalised, including a maintenance and generalisation phase could benefit the social validity of the

study as well as the lasting effects of the intervention on the participants compliant and on-task behaviour.

Conclusion

Within a multiple baseline across participants design incorporating a reversal phase with one participant (A-B-C and A-B-A-B-C), I explored the effectiveness of a technology-based self-management intervention on the compliant and on-task behaviour of two typically developing children within a general education setting. Compliant and on-task behaviour are key skills for children to develop, especially within a school setting, as these behaviours are a key part of socialisation and are closely linked to academic success in schools (Bialas & Boon, 2010). Not only did each of the participants show an improvement in their compliant behaviour after they started using the intervention, but one participant also had a concomitant increase in on-task behaviour. The use of this intervention within a classroom setting also was associated with high social validity ratings from the participants as well as their teacher. It is often reported that the behaviour of typically developing children is overlooked in schools and that teachers often report being overwhelmed and overworked. Overall, the results of this study indicate that a technology-based self-management intervention could decrease the time teachers spend attending student behaviour as well as increase student independence by putting them in charge of modifying their own behaviour.

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Appendices

Appendix A: Information sheet

Associate Professor Angelika Anderson
Faculty of Social Science
Waikato University
Email: angelika.anderson@waikato.ac.nz

Alice Higgs
Email: ah177@students.waikato.ac.nz

You are invited to take part in a research project conducted by Alice Higgs, under the supervision of Associate Professor Angelika Anderson from the Faculty of Social Science at the University of Waikato. This project is part of the requirement for completing my Master's in Behaviour Analysis at the University of Waikato. Please read this information sheet in full before deciding whether or not to participate in this research. If you would like further information about this project, you are encouraged to contact the researchers via the phone numbers or email addresses above.

What does the research involve?

The aim of the research project is to improve compliance and on-task behaviour of students aged 5 to 10 years old in a mainstream school by implementing a self-management intervention package. Compliance, defined as following instructions given by the teacher, is an important skill to have within the classroom environment. An increase in compliance has previously been associated with a decrease in problem behaviours and an increase in academic success. Non-compliance, defined as not following instructions given by the teacher, can also impede the learning of other students and cause significant distress in teachers trying to manage the behaviour instead of spending time teaching.

Who we are looking for

This project aims to recruit:

- Between one and four students who are not diagnosed with a behavioural disorder, and are not currently receiving help for their behaviour.
- A classroom teacher.

Recruitment process

- I will first provide information sheets and get consent from primary schools and the Board of Trustees to conduct the research within the school setting.
- I will next provide an information sheet and get consent from a teacher within this school to conduct the research. Once I have consent from the teacher, I will ask for recommendations of students who they believe have difficulties following instructions in the classroom.
- I will provide an advertisement, an information sheet and get consent from the parents/guardians of these recommended students.
- Once I have consent from the parents/guardians of the recommended students, I will read through an information sheet and get consent from the students.
- Throughout the recruitment process, I will be available to answer any questions by phone or email, as well as available to organise meetings.
- I will also randomly select two other students from the classroom to observe and collect compliance and on-task behaviour data on, so that I am able to compare the participating students' data to classroom data. I will randomly select two children who appear to be representative of the classroom. These will most likely be two different children each time and are likely to be children that are in the vicinity of the target children. I will not know the names of the two children and I will not collect any other data about them.

Student involvement

The students will participate in a self-management intervention during school hours and the study is not expected to exceed 10 weeks. The following outlines what the students will experience if you choose to participate in this study:

- Prior to the start of the intervention, the students will be invited to complete a 5-minute rating scale as a pre-intervention measure.
- The students will then participate in 2 to 3 teaching sessions (30 minutes each), in which I will teach strategies to manage in-class behaviour. These strategies will include understanding appropriate and inappropriate behaviours, components of monitoring behaviour (including learning to record behaviour on an iPod), as well as setting behavioural goals.
- After the teaching sessions, I will ask the students to use these strategies during class time around 3-4 times per week for approximately 5 weeks. These strategies are intended to be unobtrusive and minimally disruptive to the teaching and learning processes.
- The students will use an iPod provided by the researcher as a recording device. One application will be open on the iPod (called StickerPOP!) which is an application which allows the children to place a sticker in a box each time they follow an instruction set by the teacher. I will place restrictions on the iPod, to ensure that the children cannot do anything else on the iPod.
- Towards the end of the project, the students will be invited to complete a 5-minute rating scale as a post-intervention measure.
- Throughout the project, I will engage in regular, unobtrusive observations in the classroom.

Teacher involvement

- The teacher will be invited to take part in a 30-40 minute interview with me so I can understand more about the participating students. The teacher will also be asked to complete a 10-minute rating scale as a pre-intervention measure.
- Towards the end of the project, the teacher will be invited to complete a 10-minute rating scale as a post-intervention measure.
- Throughout the research, I will engage in regular unobtrusive observations in the classroom. The focus of these observations will be on the consenting students and two other randomly selected students. The time and duration of these observations will be decided in collaboration with the teacher and school.

Results

From implementing a self-monitoring intervention for compliance, it is expected that compliant behaviour within the classroom will increase. Additionally, it is expected that on-task behaviour within the classroom will also increase. The results will be presented within my Master's thesis. They may also be presented in the form of a research report or journal article. If requested, a summary of the report can be prepared and sent to you and the participating school, once I have finished my thesis.

Confidentiality

While participation is not anonymous as I will know who the participants are, participation in this project will remain confidential and I will not disclose identifying information to anyone. I will assign each participant and the participating school with codes or pseudonyms (fake names) so that the data collected is not linked to names to protect the confidentiality of the participants. When the data is presented in reports, presentations, or publications, neither the participants nor the school will be identifiable.

Storage of Data

After I have finished my thesis I will give all of the data to my supervisor and it will be stored on a password-protected University drive for five years. Only the researchers will have access to the data. At the end of the storage period, the data will be destroyed by deleting the electronic files.

Right to Withdraw

Participating in this project is voluntary and you, the students, parents, or teachers are under no obligation to give consent to participate. Consent is given by signing and returning the consent form to the researchers. By signing the consent form, you are giving consent for the study to be conducted in your school.

Even after consent is given, you, the student, parents, or teachers have the right to withdraw at any point in time, without explanation. This includes the withdrawal and destruction of information and data collected, up until 2 weeks after participation has been completed in the project. If the students no longer wish to participate in this project at any point in time, they will be allowed to stop.

What happens now?

If you are interested in me conducting this project in your school, please contact me via the phone number or email address at the top of this information sheet. I am available to answer questions at any time, and I am also available to arrange a time to meet with you if you would like to discuss the project further.

This research project has been approved by the Human Research Ethics Committee (Health) of the University of Waikato. Any questions about the ethical conduct of this research may be sent to the chair of the committee (humanethics@waikato.ac.nz).

Appendix B: School permission form

A completed copy of this form should be retained by both the researcher and the participant.

Research Project: Improving compliance and on-task behaviour of typically developing children with a self-management intervention within a classroom setting.

Please complete the following checklist. Tick (✓) the appropriate box for each point.	**YES**	**NO**
1. I have read the Information Sheet (or it has been read to me) and I understand it.		
2. I have been given sufficient time to consider whether or not to participate in this study.		
3. I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet.		
4. I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without penalty		
5. I have the right to decline to participate in any part of the research activity.		
6. I know who to contact if I have any questions about the study in general.		
7. I understand that the information supplied by me could be used in future academic publications.		
8. I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.		
9. I consent to the research project being conducted within this school.		
10. I wish to receive a copy of the findings		

Declaration by school:
I agree to participate in this research project and I understand that I may withdraw at any time. If I have any concerns about this project, I may contact the convenor of the University Human Research Committee (Health) (humanethics@waikato.ac.nz)

Principal (Please Print Name): _____

Signature: _____ Date: _____

Board of Trustees Representative (Please Print Name): _____

Signature: _____ Date: _____

Declaration by member of research team:
I have given a verbal explanation of the research project to the participant, and have answered any questions about it. I believe that the school understands the study and has given informed consent to participate.

Researcher (Please Print Name): _____

Signature: _____ Date: _____

Appendix C: Teacher information sheet

Associate Professor Angelika Anderson
Faculty of Social Science
Waikato University
Email: angelika.anderson@waikato.ac.nz

Alice Higgs
Email: ah177@students.waikato.ac.nz

You are invited to take part in a research project conducted by Alice Higgs, under the supervision of Associate Professor Angelika Anderson from the Faculty of Social Science at the University of Waikato. This project is part of the requirement for completing my Master's in Behaviour Analysis at the University of Waikato. Please read this information sheet in full before deciding whether or not to participate in this research. If you would like further information about this project, you are encouraged to contact the researchers via the phone numbers or email addresses above.

What does the research involve?

The aim of the research project is to improve compliance and on-task behaviour of students aged 5 to 10 years old in a mainstream school by implementing a self-management intervention package. Compliance, defined as following instructions given by the teacher, is an important skill to have within the classroom environment. An increase in compliance has previously been associated with a decrease in problem behaviours and an increase in academic success. Non-compliance, defined as not following instructions given by the teacher, can also impede the learning of other students and cause significant distress in teachers trying to manage the behaviour instead of spending time teaching.

Who we are looking for

This project aims to recruit:

- Between one and four students who are not diagnosed with a behavioural disorder, and are not currently receiving help for their behaviour.
- A classroom teacher.
- I will also randomly select two other students from the classroom to observe and collect compliance and on-task behaviour data on, so that I am able to compare the participating students' data to classroom data. I will randomly select two children who appear to be representative of the classroom. These will most likely be two different children each time and are likely to be children that are in the vicinity of the target children. I will not know the names of the two children and I will not collect any other data about them.

Your involvement

- After you have given consent to participate in the project, I will ask you for recommendations of students who you believe have difficulties following instructions in the classroom. I will provide an advertisement, information sheets and a consent form to the parents of these students.
- Once I have recruited between 1 and 4 participants, you will be invited to take part in a 30-40 minute interview with me so I can understand more about the students. I will also ask you to complete a 10-minute rating scale as a pre-intervention measure.
- I will ask you to explain to your whole class my presence in the classroom as a student who is visiting your classroom to learn about how children learn, and that I will be spending some extra time working with some of the students in the classroom.
- Towards the end of the project, I will invite you to complete a 10-minute rating scale as a post-intervention measure.

- Throughout the research, I will engage in regular unobtrusive observations in the classroom. The focus of these observations will be on the consenting students and two randomly selected students for comparison data. The duration and frequency of these observations will be decided in collaboration with you.

Student involvement

The students will participate in a self-management intervention during school hours and the study is not expected to exceed 10 weeks. The following outlines what the students will experience:

- Prior to the start of the intervention, the students will be invited to complete a 5-minute rating scale as a pre-intervention measure.
- The students will then participate in 2 to 3 teaching sessions (30 minutes each), in which I will teach strategies to manage in-class behaviour. These strategies will include understanding appropriate and inappropriate behaviours, components of monitoring behaviour (including learning to record behaviour on an iPod), as well as setting behavioural goals.
- After the teaching sessions, I will ask the students to use these strategies during class time around 3-4 times per week for approximately 5 weeks. These strategies are intended to be unobtrusive and minimally disruptive to the teaching and learning processes.
- The students will use an iPod provided by the researcher as a recording device. One application will be open on the iPod (called StickerPOP!) which is an application which allows the children to place a sticker in a box each time they follow an instruction set by the teacher. I will place restrictions on the iPod, to ensure that the children cannot do anything else on the iPod.
- Towards the end on the project, the students will be invited to complete a 5-minute rating scale as a post-intervention measure.
- Throughout the project, I will engage in regular, unobtrusive observations in the classroom.

Results

From implementing a self-monitoring intervention for compliance, it is expected that compliant behaviour within the classroom will increase. Additionally, it is expected that on-task behaviour within the classroom will also increase. The results will be presented within my Master's thesis. They may also be presented in the form of a research report or journal article. If requested, a summary of the report can be prepared and sent to you and the participating school, once I have finished my thesis.

Confidentiality

While participation is not anonymous as I will know who the participants are, participation in this project will remain confidential and I will not disclose identifying information to anyone. I will assign each participant and the participating school with codes or pseudonyms (fake names), so that the data collected is not linked to names to protect the confidentiality of the participants. When the data is presented in reports, presentations, or publications, neither the participants nor the school will be identifiable.

Storage of Data

After I have finished my thesis I will give all of the data to my supervisor and it will be stored on a password-protected University drive for five years. Only the researchers will have access to the data. At the end of the storage period, the data will be destroyed by deleting the electronic files.

Right to Withdraw

Participating in this project is voluntary and you are under no obligation to give consent to participate. Consent is given by signing and returning the consent form to the researchers. By signing the consent form, you are giving consent for the study to be conducted within your classroom.

Even after consent is given, you have the right to withdraw at any point in time, without explanation. This includes the withdrawal and destruction of information and data collected, up until 2 weeks after participation has been completed in the project. If the students no longer wish to participate in this project at any point in time, they will be allowed to stop.

What happens now?

If you are interested in me conducting this project within your classroom, please contact me via the phone number or email address at the top of this information sheet. I am available to answer questions at any time, and I am also available to arrange a time to meet with you if you would like to discuss the project further.

This research project has been approved by the Human Research Ethics Committee (Health) of the University of Waikato. Any questions about the ethical conduct of this research may be sent to the chair of the committee (humanethics@waikato.ac.nz).

Appendix D: Teacher consent form

A completed copy of this form should be retained by both the researcher and the participant.
Research Project: Improving compliance and on-task behaviour of typically developing children with a self-management intervention within a classroom setting.

Please complete the following checklist. Tick (✓) the appropriate box for each point.	**YES**	**NO**
1. I have read the Information Sheet (or it has been read to me) and I understand it.		
2. I have been given sufficient time to consider whether or not to participate in this study.		
3. I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet		
4. I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without penalty.		
5. I have the right to decline to participate in any part of the research activity.		
6. I know who to contact if I have any questions about the study in general.		
7. I understand that the information supplied by me could be used in future academic publications.		
8. I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.		
9. I consent to participate in an interview at the start of the study.		
10. I consent to complete a rating scale at the start and at the end of the study as a pre- and post-intervention measure.		
11. I consent to allowing researchers to observe in the class at agreed times.		
12. I wish to receive a copy of the findings.		

Declaration by participant:
I agree to participate in this research project and I understand that I may withdraw at any time. If I have any concerns about this project, I may contact the convenor of the University Human Research Committee (Health) (humanethics@waikato.ac.nz)

Participant's name (Please print):

Signature: Date:

Declaration by member of research team:
I have given a verbal explanation of the research project to the participant, and have answered the participant's questions about it. I believe that the participant understands the study and has given informed consent to participate.

Researcher's name (Please print):

Signature: Date:

Appendix E: Advertisement

School of Psychology

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

Research Participants Wanted!

Improving compliance and on-task behaviour of primary school students

I am looking for primary school students aged between 5 and 10 years old to take part in a project in which I will implement a self-management intervention package to improve *compliance* and *on-task behaviour*.

What is self-management?

- Evidence-based practice which uses techniques such as goal setting and self-evaluation to improve desirable behaviour or decrease problem behaviours.
- Encourages student independence, self-reliance, and the development of other life skills

Who can participate? Your child can participate if:

- If they are between 5 and 10 years old
- If they have not been diagnosed with a behavioural disorder
- If they are not currently receiving help for their behaviour

What will the students participation involve?

- This project will take approximately one term to complete (up to 10 weeks)
- Completing a 5-minute rating scale as a pre-intervention measure
- Participating in 2-3 teaching sessions (30 minutes each) to:
  - Learn strategies to manage in-class behaviour
  - Understand appropriate and inappropriate behaviours
  - Learn self-monitoring components
  - Setting behavioural goals
- Self-recording compliant behaviour for approximately 6-8 weeks during classtime
- Completing a 5-minute rating scale as a post-intervention measure

Researcher: Alice Higgs
This is my Master's thesis research and is supervised by Associate Professor Angelika Anderson.

If you are interested in your child participating in this study, please read the information sheet attached and contact me for more details via phone (0278492154) or email (ah177@students.waikato.ac.nz)

This research has been approved by the Human Research Ethics Committee (Health) of the University of Waikato. Any questions about the ethical conduct of this research can be addressed to the chair of the committee (humanethics@waikato.ac.nz).

Appendix F: Parent/Guardian information sheet

Associate Professor Angelika Anderson
Faculty of Social Science
Waikato University
Email: angelika.anderson@waikato.ac.nz

Alice Higgs
Email: ah177@students.waikato.ac.nz

Your child has been nominated by their teacher to take part in a research project conducted by Alice Higgs, under the supervision of Associate Professor Angelika Anderson from the Faculty of Social Science at the University of Waikato. This project is part of the requirement for completing my Master's in Behaviour Analysis at the University of Waikato. Please read this information sheet in full before deciding whether or not to let your child participate in this research. If you would like further information about this project, you are encouraged to contact the researchers via the phone numbers or email addresses.

What does the research involve?

The aim of the research project is to improve compliance and on-task behaviour of students aged 5 to 10 years old in a mainstream school by implementing a self-management intervention package. Compliance, defined as following instructions given by the teacher, is an important skill to have within the classroom environment. An increase in compliance has previously been associated with a decrease in problem behaviours and an increase in academic success. Non-compliance, defined as not following instructions given by the teacher, can also impede the learning of other students and cause significant distress in teachers trying to manage the behaviour instead of spending time teaching.

This study is looking to recruit between one and four students who are not diagnosed with a behavioural disorder and are not currently receiving help for their behaviour. The teacher of the students has observed that some children are having difficulties following instructions in the classroom. In addition, the school and classroom teacher of your child are willing to participate in this study to reduce non-compliance in the classroom. This study will be beneficial for children who may need additional help to improve their compliance and on-task behaviour, as well as to create good work habits.

As a part of this project, your child will participate in a self-management intervention during school hours and the study is not expected to exceed 10 weeks. The following outlines what your child will experience if you choose to participate in this study:

- Prior to the start of the intervention, your child will be invited to complete a 5-minute rating scale as a pre-intervention measure.
- Your child will then participate in 2 to 3 teaching sessions (30 minutes each), in which I will teach your child strategies to manage in-class behaviour. These strategies will include understanding appropriate and inappropriate behaviours, components of monitoring behaviour (including learning to record behaviour on an iPod), as well as setting behavioural goals.
    - If you wish, you will be able to attend the teaching sessions with your child. Details of the times and days of these sessions will be provided to you when they have been decided in consultation with your child's teacher.
- After the teaching sessions, I will ask your child to use these strategies during class time around 3-4 times per week for approximately 5 weeks. These strategies are intended to be unobtrusive and minimally disruptive to the teaching and learning processes.
- Your child will use an iPod provided by the researcher as a recording device. One application will be open on the iPod (called StickerPOP!) which is an application which

allows the child to place a sticker in a box each time they follow an instruction set by the teacher. I will place restrictions on the iPod, to ensure that no other apps can be opened on the iPod.

- Towards the end on the project, your child will be invited to complete a 5-minute rating scale as a post-intervention measure.
- Throughout the project, I will engage in regular, unobtrusive observations in the classroom.

Results

From implementing a self-monitoring intervention for compliance, it is expected that compliant behaviour within the classroom will increase. Additionally, it is expected that on-task behaviour within the classroom will also increase. The results will be presented within my Master's thesis. They may also be presented in the form of a research report or journal article. If requested, a summary of the report can be prepared and sent to you and the participating school, once I have finished my thesis. In addition to providing you with a summary of the report, I will also provide you with a short summary of your child's improvement and performance from participating in the study.

Confidentiality

While participation is not anonymous as I will know who the participants are, participation in this project will remain confidential and I will not disclose your identity or your child's identity to anyone. I will assign each participant and the participating school with codes or pseudonyms (fake names) so that the data collected is not linked to names to protect the confidentiality of the participants. When the data is presented in reports, presentations, or publications, neither the participants nor the school will be identifiable.

Storage of Data

After I have finished my thesis I will give all of the data to my supervisor and it will be stored on a password-protected University drive for five years. Only the researchers will have access to the data. At the end of the storage period, the data will be destroyed by deleting the electronic files.

Right to Withdraw

Participating in this project is voluntary and you are under no obligation to give consent for your child to participate. Consent is given by signing and returning the consent form to the researchers. By signing your consent form, you are giving consent for your child's school and teacher to disclose relevant information about your child, such as age and classroom behaviour.

If you give consent to letting your child participate in this project, you have the right to withdraw at any point in time, without explanation. This includes the withdrawal and destruction of information and data collected regarding your child, up until 2 weeks after participation has been completed in the project. If your child no longer wishes to participate in this research at any point in time, he/she will be allowed to stop.

What happens now?

If you are interested in your child participating in this project, please contact me via the phone number or email address at the top of this information sheet. I am available to answer questions at any time, and I am also available to arrange a time to meet with you if you would like to discuss the project further.

This research project has been approved by the Human Research Ethics Committee (Health) of the University of Waikato. Any questions about the ethical conduct of this research may be sent to the chair of the committee (humanethics@waikato.ac.nz).

Appendix G: Parent/Guardian consent form

A completed copy of this form should be retained by both the researcher and the participant.

Research Project: Improving compliance and on-task behaviour of typically developing children with a self-management intervention within a classroom setting.

Please complete the following checklist. Tick (✓) the appropriate box for each point.	**YES**	**NO**
1. I have read the Information Sheet (or it has been read to me) and I understand it.		
2. I have been given sufficient time to consider whether or not to let my child participate in this study.		
3. I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet.		
4. I understand that consenting for my child to take part in this study is voluntary (my choice) and that I have the right to withdraw them from the study at any time without penalty.		
5. I understand that if my child does not want to participate in the study, they will be allowed to withdraw from the study at any time without penalty.		
6. I have the right to decline for my child to participate in any part of the research activity.		
7. I know who to contact if I have any questions about the study in general.		
8. I consent to relevant information about my child (i.e., age, sex, education, classroom behaviour, management approaches) being disclosed by the teacher to the researcher.		
9. I consent to my child completing a rating scale at the start and the end of the study.		
10. I consent to my child participating in 2-3 training sessions on self-management skills.		
11. I consent to allowing researchers to observe my child in school.		
12. I understand that the information supplied by me and my child could be used in future academic publications.		
13. I understand that participation in this study is confidential and that no material, which could identify me or my child personally, will be used in any reports on this study.		
14. I understand that I can request to view any of the materials being used with my child, including self-management tools and rating scales.		
15. I would like to attend the teaching sessions with my child.		
16. I wish to receive a copy of the research findings.		

Declaration by participant:
I agree to let my child participate in this research project and I understand that I may withdraw my child at any time. If I have any concerns about this project, I may contact the convenor of the University Human Research Committee (Health) (humanethics@waikato.ac.nz)

Participant's name (Please print):

Signature: Date:

Declaration by member of research team:
I have given a verbal explanation of the research project to the participant and have answered the participant's questions about it. I believe that the participant understands the study and has given informed consent to participate.

Researcher's name (Please print):

Signature: Date:

Appendix H: Child information sheet

Research Project Information for Students

My name is Alice Higgs, and I am from the University of Waikato. I would like you to join in with a research project that I will be doing in your school. Here is a little bit of information about it, just ask me if you have any questions.

What is this project about?

We want to find out how children can learn to act or behave better in class by watching and recording their own behaviour. This is called self-management. We can then learn to change the way we behave by keeping a record of our own behaviour.

Why be involved?

If you join in, you will learn to change the way you behave in class. Learning to change your own behaviour may help you to learn better in class as well as to get along better with your teacher and your friends.

What is involved?

- I will first talk to your teacher about you.
- I will ask you to answer some questions.
- I will teach you how to keep an eye on your own behaviour using an iPod touch and set goals during 2-3 sessions.
- You will record your own behaviour during class, and I will watch you do this.
- I will ask you to answer some questions about what you think of self-management at the end of the project.

Who will know about this project?

When I write about you, I will never use your real name or your school's name, so that no-one knows that my project is about you. I will keep all of the information that I learn about you locked up safely. If you want to know what I have learnt at the end of the project you can either ask your parents and I will send them my reports.

Joining in

Your parents/guardians have already said that it is okay for you to join in with the project if you would like to. It is your choice, so you don't have to join even though your parents said you can. You can take your time to think about it. Remember, joining this project is entirely up to you. No-one will be upset or mad if you do not take part. If you say yes now, you can change your mind later if you would like, or choose not to take up in any part of the study – all you have to do is tell your teacher, parents, or me that you want to stop.

Questions

If you have any questions, you can ask your teacher, parents, or me. We will be happy to answer your questions.

Appendix I: Child assent form

Research Project: Improving compliance and on-task behaviour of typically developing children with a self-management intervention within a classroom setting.

Please complete the following checklist. Tick (✓) the appropriate box for each point.	**YES**	**NO**
1. The information sheet has been read to me and I understand it.		
2. I have been given enough time to decide if I would like to be a part of this project.		
3. I have had a chance to answer questions about the project and I am happy with the answers I have been given.		
4. I understand that agreeing to take part in this study is voluntary (my choice) and that I can stop this project at any time, and that no one will be angry with me if I change my mind.		
5. I understand that I can choose not to participate in some of the research activities if I do not want to.		
6. I know that if I have any questions, I should ask my teacher, parents, or the researchers.		
7. I know that my parents/guardians have already said it is okay for me to do this.		
8. I know that this project is about helping me with my behaviour in class, and I would like to join in.		
9. I agree to let my teacher talk to the researcher about my behaviour in class.		
10. I agree to answer some questions about what I think about my behaviour at the start and at the end of the project.		
11. I agree to join in with 2-3 sessions where I can learn how to better manage my behaviour.		
12. I agree to let the researchers watch me in class.		

(If you sign this paper, it means you have read/have been told about the study and would like to be in it. If you do not want to be in the study, don't sign the paper).

Declaration by participant:
I agree to join in with this research project and I understand that I can stop at any time. If I have any concerns about this project, I can talk to my teacher, my parents, or the researcher.

Student's name (Please print): _____

Signature: _____ Date _____

Declaration by member of research team:
I have given a verbal explanation of the research project to the participant, and have answered the participant's questions about it. I believe that the participant understands the study and has given informed consent to participate.

Researcher's name (Please print): _____

Signature: _____ Date: _____

Appendix J: Functional Assessment Interview (FAI)

Student: _____ Age: _____ Sex: M F
Date of Interview: _____ Interviewer: _____
Respondents:_____

A. DESCRIBE

1. The behaviour that is causing the most concern:_____
   _____
2. The frequency of the behaviour (how often do you notice it occurring)
   _____
3. The duration (how long it lasts)_____
4. The intensity (how severe)_____
5. The nature of the tasks or activities that are usually present when the behaviour occurs (task duration, preferred or non-preferred, difficult or easy, novel or familiar, boring or stimulating)_____
   _____
   _____
   _____
6. The situations or times when the behaviour does not occur:_____
   _____
   _____
   _____

B. DEFINE SETTING EVENTS THAT PREDICT OR SET UP THE PROBLEM BEHAVIOURS

1. Do you know of any medical or physical conditions (if any) does the student experience that may affect his or her behaviour (e.g., asthma, allergies, rashes, sinus infections,
   seizures)?_____
   _____
   _____
   _____

C. DEFINE SPECIFIC IMMEDIATE ANTECEDENT EVENTS THAT PREDICT WHEN THE BEHAVIOURS ARE LIKELY AND NOT LIKELY TO OCCUR

1. *Times of Day:* When are the behaviours most and least likely to happen?
   Most likely:_____
   _____
   Least likely:_____
   _____
2. *Settings:* Where are the behaviours most and least likely to happen?
   Most likely:_____
   _____
   Least likely:_____
   _____
3. *People:* With whom are the behaviours most and least likely to occur?
   Most likely:_____
   _____

Least likely:_____
_____

4. *Activity:* What activities are most and least likely to produce the behaviours?
   Most likely:_____
   _____
   Least likely:_____
   _____
5. Are there particular situations not listed above that sometimes seem to "set off" the behaviours, such as particular demands, noises, lights, clothing, people?_____
   _____
6. What one thing could you do that would most likely make the undesirable behaviours occur?_____
   _____
   _____

D. <u>WHAT ARE THE PRIMARY WAYS THE STUDENT COMMUNICATES WITH OTHER PEOPLE?</u>

1. What are the general expressive communication strategies used by or available to the student?_____
   _____
2. With regard to the students receptive communication or ability to understand other persons…
   a) Does the student understand requests or instructions (how many, simple, complex?_____
      _____
      _____
   b) During the behavioural event, is the student able to understand requests or instructions at the same level?_____
      _____

E. <u>WHAT ARE THINGS THE STUDENT LIKES AND ARE REINFORCING FOR HIM OR HER?</u>

1. Food items; objects; activities; other_____
   _____
   _____
   _____

Appendix K: Story about following instructions

Following Instructions

Teachers often give out instructions.

Instructions are about things that the teachers want me to do.

My classmates follow instructions.

I follow instructions too.

When I follow instructions, it makes me learn better.

It also makes my teachers and parents happy.

When my teachers and parents are happy, I am happy too.

Appendix L: Role-play situations

	Teachers Request	Compliant Behaviour	Non-compliance
1	Everybody sit down on the mat	Sit down on the mat	Carry on doing your work
2	Get your books out	Gets books out	Talks to friends
3	After you are back in class after MT and Lunchtime	SSR (Silent Sustained Reading)	Sitting doing nothing
4	Time to hop off of the computer and sit at your desks	Gets off computer and sits at desk	Stays on computer
5	After you have done your spelling, you need to do independent writing.	Moving on to the next task once you have finished the first…	Stopping after the first task
6			
7			
8			

Appendix M: Reinforcement survey

Student Name:

Check off 3 things that you would like as a reward:

☐ Stickers _____

☐ Lollies _____

☐ Chocolate _____

☐ Free time on the computer for 15 minutes

☐ Word Search Activity

☐ Good note home

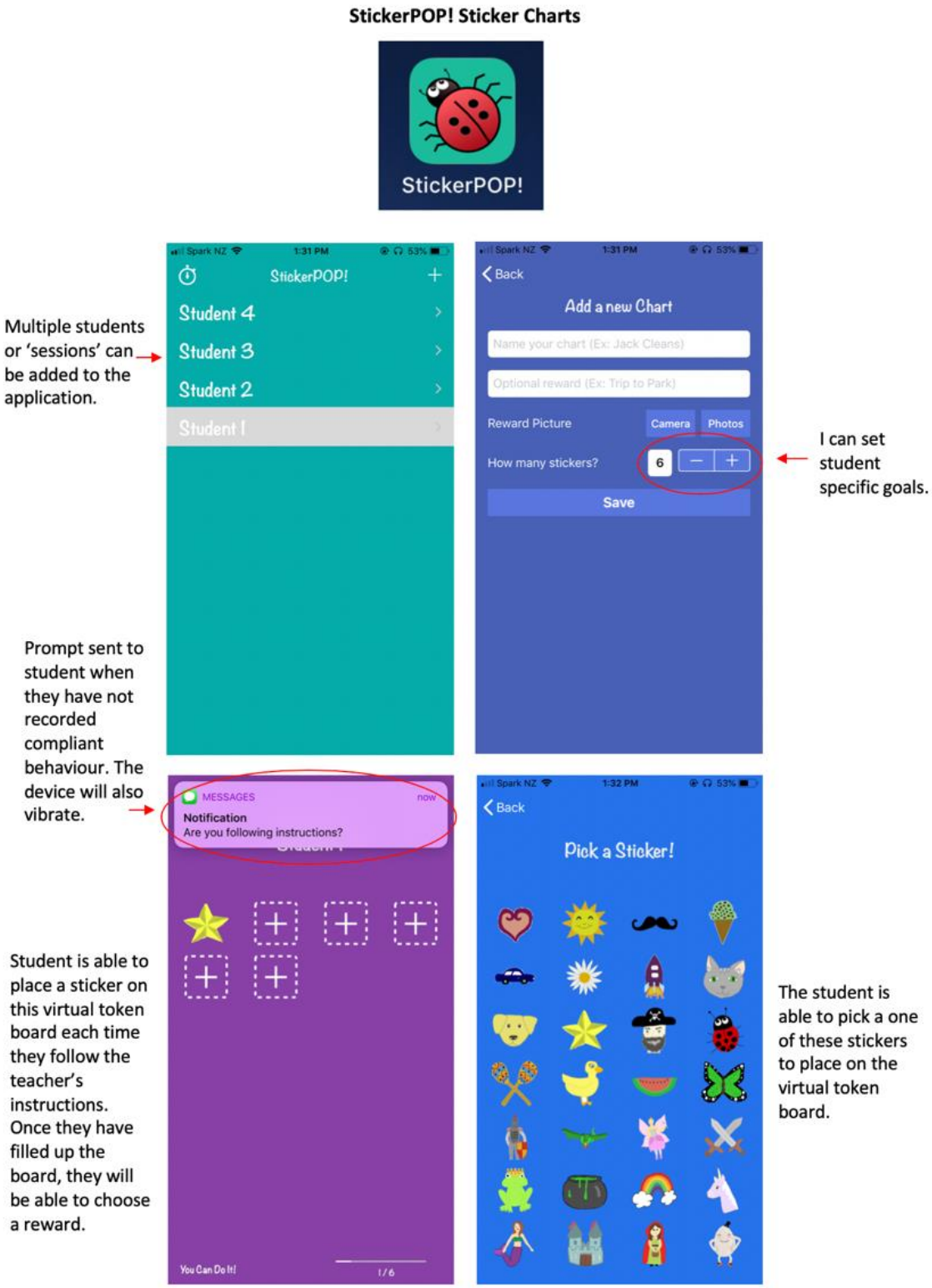
☐ Dot to Dot activity

☐

☐

☐

Appendix N: Self-monitoring recording application



Appendix O: Preliminary observation collection sheet

Date: _____ Teacher: _____
Activity:_____
Start time:_____ End time: _____

- **Normative data for the number of instructions given per session** (tally chart)

Student-specific instructions	*Class instructions*
i.e. Instructions delivered by the teacher-directed to specific students in the class (either by name, eye contact or physical contact)	*i.e. Instructions delivered by the teacher-directed to the whole class*
Total:	*Total:*

- **Normative data for the rate of typical on-task behaviour**

Momentary Time Sampling for On-Task Behaviour

On-task behaviour – behaviour that is relevant to the assigned task

Length of each interval: 30 seconds

At the end of each interval:

- + if the target student is engaging in task-relevant behaviour
- - if the target student is not engaging in task-relevant behaviour

	1	2	3	4	5	6	7	8	9	10
Peer X										
Peer Y										

	11	12	13	14	15	16	17	18	19	20
Peer X										
Peer Y										

	21	22	23	24	25	26	27	28	29	30	% of Intervals
Peer X											
Peer Y											

- **Normative data for the rate of typical compliant behaviour**

Event Recording for Compliant Behaviour

Teachers Requests

- Undirected requests – requests that are addressed to the whole class and are not specific to the individual (e.g., take out your books).
- Directed requests – requests that are directed to the student, as indicated by the teacher directing eye contact to the individual when making the instruction, or the teacher touching the student when making the instruction, or when the teacher includes the student's name in the instruction (e.g., __ take out your book).

Compliance and Non-compliance

- Compliance – initiating the required response within 10 seconds following the teacher's request.
- Non-compliance – one of the following behaviours within 10 seconds of the teacher's request.

	Peer X		Peer Y	
	Directed/ Undirected	Compliant Behaviour	Directed/ Undirected	Compliant Behaviour
1	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
2	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
3	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
4	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
5	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
6	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
7	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
8	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
9	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
10	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
11	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
12	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
12	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
14	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No
15	☐ Directed ☐ Undirected	☐ Yes ☐ No	☐ Directed ☐ Undirected	☐ Yes ☐ No

Appendix P: Data collection sheets (sample)

(To be used during baseline, intervention and follow-up observations)

Date: _____ Teacher:_____
Activity:_____ Start time:_____ End time: _____ Observer: _____

Event Recording Form for Compliant Behaviour

Definitions

Teachers Requests

- Undirected requests – requests that are addressed to the whole class and are not specific to the individual (e.g. take out your books).
- Directed requests – requests that are directed to the student, as indicated by the teacher directing eye contact to the individual when making the instruction, or the teacher touching the student when making the instruction, or when the teacher includes the student's name in the instruction (e.g., __ take out your book).
- Routine/Embedded – instructions or requests that are not said out loud, but the children are expected to do (e.g., timetable on the board – SSR after morning tea and lunch).

Compliance and Non-compliance

- Compliance – initiating the required response within 10 seconds following the teacher's request.

Participant 1			Participant 2		
Teacher Requests		Compliance	Teacher Requests		Compliance
1	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No	1	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No
2	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No	2	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No
3	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No	3	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No
4	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No	4	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No
5	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No	5	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No
6	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No	6	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No
7	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No	7	☐ Directed ☐ Undirected ☐ Routine	☐ Yes ☐ No

Momentary Time Sampling Record Form for On-Task Behaviour

Target Behaviour: On-task behaviour – behaviour that is relevant to the assigned task. Includes: Sitting appropriately, or physically being in the appropriate place at the right time (where they should be). And paying attention to or actively working on the task at hand.

Length of each interval: 30 seconds

At the end of each interval, mark
- + if the target student is engaging in task-relevant behaviour
- - if the target student is not engaging in task-relevant behaviour

5m	1	2	3	4	5	6	7	8	9	10
Participant 1										
Participant 2										
Peer X										
Peer Y										

10m	11	12	13	14	15	16	17	18	19	20
Participant 1										
Participant 2										
Peer X										
Peer Y										

15m	21	22	23	24	25	26	27	28	29	30
Participant 1										
Participant 2										
Peer X										
Peer Y										

Appendix Q: Behaviour Intervention Rating Scale (BIRS)

(Elliott & Treuting, 1991)

Pre-Measure

After sharing with you a potential intervention to help the student to be more compliant in class, please evaluate the intervention by circling the number which best describes agreement or disagreement with each statement. You *must* answer each question.

		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1.	This would be an acceptable intervention for the child's problem behaviour.	1	2	3	4	5	6
2.	Most teachers would find this intervention appropriate for behaviour problems in addition to the one described.	1	2	3	4	5	6
3.	The intervention should prove effective in changing the child's problem behaviour.	1	2	3	4	5	6
4.	I would suggest the use of this intervention to other teachers.	1	2	3	4	5	6
5.	The child's behaviour problem is severe enough to warrant use of this intervention.	1	2	3	4	5	6
6.	Most teachers would find this intervention suitable for the behaviour problem described.	1	2	3	4	5	6
7.	I would be willing to use this in the classroom setting.	1	2	3	4	5	6
8.	The intervention would *not* result in negative side-effects for the child.	1	2	3	4	5	6
9.	The intervention would be an appropriate intervention for a variety of children.	1	2	3	4	5	6
10.	The intervention is consistent with those I have used in classroom settings.	1	2	3	4	5	6
11.	The intervention is a fair way to handle the child's problem behaviour.	1	2	3	4	5	6
12.	The intervention is reasonable for the behaviour problem described.	1	2	3	4	5	6
13.	I like the procedures used in the intervention.	1	2	3	4	5	6
14.	This intervention is a good way to handle the child's problem behaviour	1	2	3	4	5	6
15.	Overall, the intervention would be beneficial for the child.	1	2	3	4	5	6
16.	The intervention would quickly improve the child's behaviour.	1	2	3	4	5	6
17.	The intervention would produce a lasting improvement in the child's behaviour.	1	2	3	4	5	6
18.	The intervention would improve the child's behaviour to the point that it would not noticeably deviate from other classmates behaviour.	1	2	3	4	5	6
19.	Soon after using the intervention, the teacher would notice a positive change in the problem behaviour.	1	2	3	4	5	6
20.	The child's behaviour will remain at an improved level even after the intervention is discontinued.	1	2	3	4	5	6
21.	Using the intervention should not only improve the child's behaviour in the classroom, but also in other settings (e.g., other classrooms, home).	1	2	3	4	5	6
22.	When comparing this child with a well-behaved peer before and after the use of the intervention, the child's and the peer's behaviour would be more alike after using the intervention.	1	2	3	4	5	6
23.	The intervention should produce enough improvement in the child's behaviour so the behaviour no longer is a problem in the classroom.	1	2	3	4	5	6
24.	Other behaviours related to the problem behaviour also are likely to be improved by the intervention.	1	2	3	4	5	6

Post-Measure

After experiencing the effects of the self-management intervention, please evaluate the intervention by circling the number which best describes agreement or disagreement with each statement. You *must* answer each question.

		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1.	This would be an acceptable intervention for the child's problem behaviour.	1	2	3	4	5	6
2.	Most teachers would find this intervention appropriate for behaviour problems in addition to the one described.	1	2	3	4	5	6
3.	The intervention should prove effective in changing the child's problem behaviour.	1	2	3	4	5	6
4.	I would suggest the use of this intervention to other teachers.	1	2	3	4	5	6
5.	The child's behaviour problem is severe enough to warrant use of this intervention.	1	2	3	4	5	6
6.	Most teachers would find this intervention suitable for the behaviour problem described.	1	2	3	4	5	6
7.	I would be willing to use this in the classroom setting.	1	2	3	4	5	6
8.	The intervention would *not* result in negative side-effects for the child.	1	2	3	4	5	6
9.	The intervention would be an appropriate intervention for a variety of children.	1	2	3	4	5	6
10.	The intervention is consistent with those I have used in classroom settings.	1	2	3	4	5	6
11.	The intervention was a fair way to handle the child's problem behaviour.	1	2	3	4	5	6
12.	The intervention is reasonable for the behaviour problem described.	1	2	3	4	5	6
13.	I like the procedures used in the intervention.	1	2	3	4	5	6
14.	This intervention was a good way to handle the child's problem behaviour.	1	2	3	4	5	6
15.	Overall, the intervention would be beneficial for the child.	1	2	3	4	5	6
16.	The intervention would quickly improve the child's behaviour.	1	2	3	4	5	6
17.	The intervention would produce a lasting improvement in the child's behaviour.	1	2	3	4	5	6
18.	The intervention would improve the child's behaviour to the point that it would not noticeably deviate from other classmates behaviour.	1	2	3	4	5	6
19.	Soon after using the intervention, the teacher would notice a positive change in the problem behaviour.	1	2	3	4	5	6
20.	The child's behaviour will remain at an improved level even after the intervention is discontinued.	1	2	3	4	5	6
21.	Using the intervention should not only improve the child's behaviour in the classroom, but also in other settings (e.g., other classrooms, home).	1	2	3	4	5	6
22.	When comparing this child with a well-behaved peer before and after the use of the intervention, the child's and the peer's behaviour would be more alike after using the intervention.	1	2	3	4	5	6
23.	The intervention should produce enough improvement in the child's behaviour so the behaviour no longer is a problem in the classroom.	1	2	3	4	5	6
24.	Other behaviours related to the problem behaviour also are likely to be improved by the intervention.	1	2	3	4	5	6

Appendix R: Children's Intervention Rating Profile (CIRP)

Pre-measure

Note to researcher: The items must be read to the student to ensure comprehension. Instruct the student to circle to face that corresponds with their answer.

		I do not agree					I agree
1.	The method that the researcher described to me to help me with my behaviour seems fair.						
2.	The method is too hard on me.						
3.	The method will cause me some problems with my friends.						
4.	There are better ways to help with my behaviour than the one described here.						
5.	The method will help other children too.						
6.	I like the method that the researcher just shared with me.						
7.	I think the method will help me do better in school.						

Post-measure

Note to researcher: The items must be read to the student to ensure comprehension. Instruct the student to circle to face that corresponds with their answer.

		I do not agree					I agree
1.	The method that I've been taught to help me with my behaviour seems fair.						
2.	The method is too hard on me.						
3.	The method may cause me some problems with my friends.						
4.	There are better ways to help with my behaviour than the one that I've been taught.						
5.	The method will help other children too.						
6.	I like the method that the researcher taught me.						
7.	I think the method will help me do better in school.						

Appendix S: Treatment fidelity checklist

INTERVENTION FIDELITY CHECKLIST

Components of Intervention

		Yes	No
1	Before the start of the intervention, make sure each student has the iPod touch, with the self-recording app open.	☐	☐
2	Inform the student that the self-management intervention is going to take place by saying *"We are going to start our game now."*	☐	☐
3	Inform the student of the goal and reward *"We need to have at least (target number) stickers in order for you to get (reward)."*	☐	☐
4	For each instruction given by the teacher during the session, if the children do not self-record within 5-seconds completion of the action, prompt to do so.	☐	☐
5	Review each student's self-recording app and deliver the reward accordingly.	☐	☐